

Before the
FEDERAL COMMUNICATIONS COMMISSION
 Washington, D.C. 20554

In the Matter of)	
)	
Rulemaking to Amend Parts 1, 2, 21, and 25)	CC Docket No. 92-297
of the Commission's Rules to Redesignate)	
the 27.5-29.5 GHz Frequency Band, to)	
Reallocate the 29.5-30.0 GHz Frequency Band,)	
to Establish Rules and Policies for Local)	
Multipoint Distribution Service and for)	
Fixed Satellite Services)	
)	

FIRST REPORT AND ORDER
 and
FOURTH NOTICE OF PROPOSED RULEMAKING

Adopted: July 17, 1996 Released: July 22, 1996

Comment Date: August 12, 1996
 Reply Comment Date: August 22, 1996

By the Commission:

TABLE OF CONTENTS

I. INTRODUCTION	1-5
II. BACKGROUND	
A. Proposed systems in the 28 GHz band	13
1. LMDS Proposals	14-16
2. Satellite Proposals	17
a. Geostationary-orbit fixed satellite service proposals ("GSO/FSS") ...	18-19
b. Non-geostationary-orbit fixed satellite service proposal ("NGSO/FSS")....	20

c.	Non-geostationary-orbit mobile satellite service ("NGSO/MSS") feeder links	21
B.	Outcome of The World Radiocommunications Conference 1995	22-24
III.	DISCUSSION	
A.	NGSO/FSS or GSO/FSS LMDS - Co-frequency Sharing Issues	25-28
B.	Services above 40 GHz	29-31
C.	Band Plan Proposed in Third NPRM and Alternative Band Plans Considered	
1.	Third NPRM	32-37
2.	Commission Band Segmentation Options Considered	38-40
D.	Commission Band Segmentation Decision for the 27.5-30.0 GHz Band	41-44
1.	Primary LMDS Spectrum	45-50
a.	Grandfathering CellularVision's NYPMSA License	51-55
b.	Effect of Band Segmentation on CellularVision's NYPMSA License	56
2.	Primary GSO/FSS Spectrum	57-58
3.	Primary NGSO/FSS Spectrum	59-62
E.	Inter- and Intra- Service Sharing in the 29.1-29.5 GHz Band	
1.	Sharing in the 29.1-29.25 GHz Band	63-66
2.	Sharing in the 29.1-29.25 GHz Band	67-71
3.	Sharing in the 29.25 - 29.5 GHz Band	72-74
F.	Downlink 17.7-20.2 GHz Frequency Band Segmentation	75-80
1.	Coordination Procedures	81
G.	Allocation at 29.5-30.0 GHz	82-85
H.	Point-to-Point Microwave	86-94
IV.	FOURTH NOTICE OF PROPOSED RULEMAKING	
A.	Proposal to designate the 31.0-31.3 GHz band for LMDS	
1.	Introduction	95
2.	Background	96-99
3.	Discussion	100-104
B.	LMDS Eligibility NPRM	
1.	Introduction; Executive Summary	105-106
2.	Background	
a.	Notice	107-109
b.	Comments	110-118
c.	1996 Act	119-124
3.	Discussion	125-136
V.	CONCLUSION	137
VI.	PROCEDURAL MATTERS	
A.	Regulatory Flexibility Act	138-139
B.	Ex Parte Rules -- Non-Restricted Proceeding	140

C. Comment Dates	141
D. Initial Paperwork Reduction Act of 1995 analysis	142
E. Further Information	143
VII. ORDERING CLAUSES	144-145
APPENDIX A List of Parties filing Comments	
APPENDIX B Rule Amendments to 47 C.F.R Part 25 and Part 101	
APPENDIX C Regulatory Flexibility Act Analysis	

I. INTRODUCTION

1. This proceeding involves the development of one of the largest contiguous spectrum segments available to the Commission, "the 28 GHz band."¹ The commercialization of this spectrum enables consumers to receive emerging domestic and global technologies via multiple service providers. Our plan for the band permits a competitive market-driven process to determine which services will succeed.

2. With this *Report and Order*, we designate band segments in the 28 GHz band for several types of wireless systems, clearing the way for licensing Local Multipoint Distribution Service ("LMDS") providers, Fixed Satellite Service ("FSS") systems, and feeder links for certain Mobile Satellite Service ("MSS") systems. The associated downlink bands for satellite services are designated as well.² We also adopt a *Fourth Notice of Proposed Rulemaking* proposing to designate an additional band segment, 31.0-31.3 GHz, for LMDS use on a primary protected basis. The Fourth Notice also seeks comment on whether the Commission should adopt eligibility or use restrictions for incumbent local exchange carriers ("LECs") and cable operators for acquisition of LMDS spectrum within their geographic service areas.

3. Our band segmentation plan seeks to promote competition by permitting all proposed services to develop and offer innovative consumer services such as video program distribution, two-way interactive video, teleconferencing, telemedicine, telecommuting, and high speed data services within our borders and around the globe.

4. In a *Third Notice of Proposed Rulemaking*, adopted July 28, 1995,³ we proposed a

¹ This refers to the 27.5-30.0 GHz frequency band.

² Satellite downlinks paired with satellite uplinks in the 28 GHz band are in the 17.7-20.2 GHz band.

³ *In the Matter of Rulemaking to Amend Parts 1, 2, 21, and 25 of the Commission's Rules to Redesignate the 27.5-29.5 GHz Frequency Band, to Reallocate the 29.5-30.0 GHz Frequency Band, to Establish Rules and Policies for Local Multipoint Distribution Service and for Fixed Satellite Services and Suite 12 Group*

band plan to permit all of the proposed services in the 28 GHz band - LMDS, geostationary-orbit FSS ("GSO/FSS") systems, non-geostationary orbit FSS ("NGSO/FSS") systems, and feeder links for non-geostationary orbit MSS ("NGSO/MSS" or "Big LEO") systems. We also proposed rules and policies to govern the LMDS service, issued a Supplemental Tentative Proposal on CellularVision U.S.A.'s ("CellularVision") pioneer's preference application, proposed auction rules for LMDS, and proposed to change the MSS allocation at the 29.5-30.0 GHz band.

5. In response to the *Third NPRM*, we received forty-four comments and nineteen reply comments from entities representing diverse segments of the communications industry.⁴ The majority of commenters, representing LMDS proponents and the satellite industry, recognized that our proposed band plan was a reasonable compromise to accommodate all interested parties in the band and generally expressed the desire for more unencumbered spectrum in the 28 GHz band for their proposed service. We will address issues relating to service rules for both GSO/FSS and NGSO/FSS systems proposing to operate in the 28 GHz band in a forthcoming *Report and Order*. Service and auction rules relating to LMDS will also be addressed in a separate *Report and Order*.

II. BACKGROUND

6. The 27.5-29.5 GHz frequency band is allocated for fixed service, fixed-satellite service uplinks and mobile service.⁵ In January 1991, the Commission granted the application of CellularVision's predecessor-in-interest, Hye Crest, Inc., for a license to provide LMDS in the 27.5-28.5 GHz frequency band within the New York City Primary Metropolitan Statistical Area (NYPMSA).⁶

7. Meanwhile, NASA's successful launch and operation of its experimental Advanced Communications Technology Satellite (ACTS) initiated demand by satellite entities for the use of the 28 GHz band, and its associated downlink bands. In 1990, Motorola Satellite Communications, Inc. applied for feeder links for its NGSO/MSS system in this band.⁷

Petition for Pioneer's Preference, CC Docket No. 92-297, 11 F.C.C. Rcd. 53 (1995) ("*Third NPRM*").

⁴ A complete list of commenters is provided in Appendix A.

⁵ See 47 C.F.R. § 2.106.

⁶ *Hye Crest Management, Inc.* 6 F.C.C. Rcd. 332 (1991). The Commission granted the application pursuant to waiver of the point-to-point rules in Part 21 to allow a fixed cellular point-to-multipoint operation for video distribution.

⁷ In July 1990, Norris Satellite Communications Inc. filed an application to provide satellite services in the 28 GHz band and obtained an authorization in 1992. However, the Commission has recently declared Norris' authorization null and void for failing to begin timely system construction. See *In The Matter of Norris Satellite Communications, Inc. For Authority to Construct, Launch, and Operate a Ka-Band Satellite*

8. This *Report and Order* is the culmination of a proceeding that was initiated in 1992 by three petitions for rulemaking proposing changes in the rules concerning fixed stations in the 28 GHz band.⁸ In the *First NPRM*, released in January 1993, the Commission tentatively concluded that redesignation from fixed point-to-point use to fixed point-to-multipoint could stimulate greater use of the 27.5-29.5 GHz band.⁹ The Commission also proposed rules for implementation of LMDS service. Based on CellularVision's existing technology, we also proposed two spectrum blocks of 1000 MHz each for LMDS. In the *First NPRM* the Commission also requested comment regarding the effect of redesignation and the proposed rules on any proposed satellite use of the band.

9. The majority of commenters and reply commenters supported the Commission's finding of widespread interest in both point-to-multipoint and satellite use of the 28 GHz band. The Commission considered various proposals for the 28 GHz band and released the *Second NPRM* in February 1994.¹⁰ We tentatively concluded that it would serve the public interest to allow terrestrial and satellite providers to co-exist in the 28 GHz band. We then established the LMDS/FSS 28 GHz Band Negotiated Rulemaking Committee ("NRMC") to develop technical rules for sharing the band.¹¹

10. Despite the significant efforts of the parties involved, the NRMC did not reach consensus on a sharing plan.¹² It concluded that LMDS and FSS service uplinks are not technically able, at this time, to reasonably share the same spectrum. However, CellularVision, Texas Instruments, and Motorola were able to reach general agreement on technical parameters allowing LMDS hub-to-subscriber links and feeder links for NGSO/MSS systems to share the same spectrum, subject to specific agreement on sharing criteria. LMDS proponents and Motorola have not been able to develop any mutually agreed upon sharing criteria for NGSO/MSS feeder links and LMDS subscriber-to-hub links. *See infra* ¶ 37. There was also some preliminary indication that limited sharing could be achieved between

System DA 96-363 (released March 14, 1996). This decision is subject to Norris' application for review.

⁸ See *Third NPRM* at ¶ 10 for a summary of these petitions.

⁹ See *In the Matters of Rulemaking to Amend Part 1 and Part 21 of the Commission's Rules to Redesignate the 27.5-29.5 GHz Frequency Band and to Establish Rules and Policies for Local Multipoint Distribution Service*, 8 F.C.C. Rcd. 557 (1993) ("*First NPRM*").

¹⁰ See *In the Matters of Rulemaking to Amend Part 1 and Part 21 of the Commission's Rules to Redesignate the 27.5-29.5 GHz Frequency Band and to Establish Rules and Policies for Local Multipoint Distribution Service Second Notice of Proposed Rulemaking*, 9 F.C.C. Rcd. 1394 (1994) ("*Second NPRM*").

¹¹ The LMDS/FSS 28 GHz Band NRMC was made up of a representative group of potential service providers and manufacturers from both industries.

¹² The NRMC met between July 26, 1994 and September 23, 1994, concluding when the established two month time period expired. See *Report of the LMDS/FSS 28 GHz Negotiated Rulemaking Committee* (September 23, 1994).

FSS gateway stations (either non-geostationary or geostationary orbit) and LMDS.¹³

11. In the time between the NRMC and the *Third NPRM*, Commission staff conducted several meetings with interested parties to discuss further issues regarding band segmentation and sharing. In the *Third NPRM* we proposed a band segmentation plan that divides the 28 GHz band into discrete spectrum segments with each segment designated to either GSO/FSS, NGSO/FSS, MSS feeder links, or LMDS, on a primary or co-primary basis. We requested that "any commenter asserting that the band plan does not provide sufficient capacity for its system, . . . specify the minimum spectrum required to support its system, supporting this assertion with a concrete technical and economic analysis, and . . . propose a plan that accommodates the reasonable requirements of all qualified applicants."¹⁴

12. Below we provide a summary of systems proposing service in the 28 GHz band and discuss relevant international allocation decisions influencing our domestic band plan. We then discuss issues concerning the proposed band plan, alternative band plans considered, and present our final band plan.

A. Proposed systems for the 28 GHz band

13. In the *Third NPRM* we described the characteristics of the LMDS, FSS, and MSS systems proposed for the 28 GHz band.¹⁵ Following is a summary of these characteristics, including a description of new satellite applicants and any modifications in the system proponents' applications since the adoption of the *Third NPRM*.

1. LMDS Proposals:

14. LMDS proponents indicate that this new technology will allow LMDS providers to offer services that compete both with LECs in the provision of local exchange service, and with cable operators in the provision of video programming. Very high subscriber capacity for two-way video telecommunications is available through LMDS technology developed for use in the 28 GHz frequency band. Hub transceivers operate in small cells, typically six miles in diameter, which transmit to and receive transmissions from subscriber locations. Because the cells are small, and arranged in a typical cellular pattern, a very high level of frequency reuse is possible. This pattern, combined with the availability of broadband microwave spectrum, results in sufficient capacity in the proposed LMDS system designs offer services that compete both with local exchange carriers in the provision of local exchange service, and with cable operators in the provision of video programming even in urban areas.

¹³ The term "gateways" as used in this context, means earth stations which are limited in number, and are generally larger and easier to coordinate than widely-deployed user terminals.

¹⁴ *Third NPRM* at ¶ 35.

¹⁵ See *Third NPRM* at ¶¶ 17-32.

We expect that LMDS providers will offer facilities-based competition to traditional cable and telephone carriers -- greatly enhancing customer choice, and facilitating the rapid dissemination of innovative communications services with the entry of multiple providers into the market.

15. The wealth of innovative services possible with the LMDS broadband spectrum we make available includes two-way video, teleconferencing, telemedicine, telecommuting, data services and global networks. LMDS systems have the capacity to provide broadband video-on-demand and distance learning. Moreover, LMDS' cellular-like capabilities enable it to offer diverse services within the same region, and to jointly offer services traditionally provided by separate communications service providers.

16. LMDS has attracted attention from both developed and developing countries. Canada has begun licensing this technology (called LMCS) in three gigahertz of spectrum in the frequency band 25.35 to 28.35 GHz. At least six other countries, including Mexico and Venezuela, have licensed LMDS on an experimental or permanent basis in the 28 GHz band.¹⁶ LMDS developers offer the prospect of modern wireless telephone systems, video distribution, and other communications services to developing countries that lack wireline or cable infrastructure.

2. Satellite Proposals:

17. The satellite industry perceives the 28 GHz band as primarily the location for the development of new FSS broadband services provided directly to the home, but also as the expansion band for accommodating growth in existing FSS services. The band is also seen as the location of feeder links for MSS use. The 28 GHz band has the capability to sustain the use of very small earth station antennas and to provide high-speed, broadband interactive services on demand. Three different types of satellite system uses have been proposed in this band: GSO/FSS, NGSO/FSS and feeder links for NGSO/MSS systems. Below we describe new applications, modifications or amendments to existing applications since the adoption of the *Third NPRM*.

a. *Geostationary-Orbit Fixed-Satellite Service Proposals ("GSO/FSS")*

18. Concurrent with the release of the *Third NPRM*, the Commission placed the five Ka-band satellite applications which were on file on public notice and established a September 29, 1995 cut-off date for filing applications to be considered with them.¹⁷ In response, we received thirteen new satellite system applications, amendments, or modifications to

¹⁶ *Ex parte* notice letter, Michael Gardner, P.C., to William Caton, Acting Secretary, Federal Communications Commission, February 16, 1995; *ex parte* notice letter, Texas Instruments, Inc., to William Caton, June 1, 1995.

¹⁷ Public Notice, Report No. SPB-20, Release No. DA 95-1689, July 28, 1995.

applications for GSO/FSS systems in this band.¹⁸

19. The GSO/FSS applicants propose a variety of broadband services such as: interactive digital voice, data, and video; electronic messaging; facsimile; video telephony; videoconferencing; satellite news gathering; computer access; direct-to-home ("DTH") video, and telemedicine. Eight applicants propose global coverage and five applicants propose regional coverage.¹⁹

b. *Non-Geostationary-Orbit Fixed-Satellite Service Proposal ("NGSO/FSS")*

20. Teledesic Corporation is the only NGSO/FSS applicant on file with the Commission.²⁰ Teledesic proposes a constellation of 840 low-Earth Orbit ("LEO") satellites to provide "broadband capacity in the sky" such as voice, facsimile, two-way digital data, videoconferencing, interactive multi-media and other types of broadband services. Teledesic requests 500 MHz of spectrum in each direction for its standard terminal links, specifically, 28.6-29.1 GHz (uplink) and 18.8-19.3 GHz (downlink). It also requests authority to operate using an additional 800 MHz in the 28 GHz band for gateway-to-satellite feeder links.

c. *Non-Geostationary-Orbit Mobile Satellite Service ("NGSO/MSS") Feeder Links*

21. Feeder links for NGSO/MSS systems use frequencies allocated to the FSS to interconnect a mobile satellite space station with other fixed communications networks by means of one or more central earth stations. The user transceivers are connected to the mobile satellite space station using other mobile satellite frequencies. Motorola, Inc. and TRW Inc. are currently the only two licensed NGSO/MSS systems that have applications for

¹⁸ See applications for AT&T Corp. (File No. 156-162-SAT-P/LA-95); Comm. Inc. (File Nos. 163-166-SAT-P/LA-95 and 201-SAT-MISC-95); EchoStar Satellite Corporation (File No. 167/168-SAT-P/LA-95); GE American Communications, Inc. (File No. 169-173-SAT-P/LA-95); Hughes Communications Galaxy, Inc. (File Nos. 3/4-DSS-P/LA-94; CSS-94-021-025 and 174-181-SAT-P/LA-95); KaStar Satellite Communications Corp. (File Nos. 127-SAT-P/LA-95 and 203-SAT-P/LA-95); Lockheed Martin Corporation (File No. 182-186-SAT-P/LA-95); Loral Space & Communications, Ltd. (application originally filed as Loral Aerospace Holdings, Inc.) (File Nos. 109-SAT-P/LA-95; 110-SAT-P-95; 187-SAT-AMEND-95 and 188/189-SAT-P/LA-95); Morning Star Satellite Co. (File No. 190-193-SAT-P/LA-95); NetSat 28 (File No. 194-SAT-P/LA-95); Orion Asia Pacific Corporation (File No. 206-SAT-AMEND-95); Orion Atlantic, L.P. (File No. 204-SAT-ML-95); Orion Network Systems, Inc. (File Nos. 195-197-SAT-P/LA-95; 205-SAT-AMEND-95); PanAmSat Corporation (File Nos. 117-SAT-AMEND-95; 198/199-SAT-P/LA-95 and 202-SAT-AMEND-95); and VisionStar, Inc. (File No. 200-SAT-P/LA-95).

¹⁹ AT&T Corp., GE American Communications, Inc., Hughes Communications Galaxy, Inc., Lockheed Martin Corporation, Loral Space & Communications, Ltd., MorningStar Satellite Co., Orion Asia Pacific Corporation, Orion Atlantic, L.P., Orion Network Systems, Inc., and PanAmSat Corporation propose global systems. The following applicants propose regional service: Comm, Inc., EchoStar Satellite Corporation, KaStar Satellite Communications Corp., NetSat 28, and VisionStar, Inc.

²⁰ See File Nos. 22-DSS-P/LA-94(840); 43-SAT-AMEND-95 and 127-SAT-AMEND-95.

NGSO/MSS feeder links in the 28 GHz band. Specifically, the Commission conditionally authorized Motorola to construct feeder uplinks in the 29.1-29.3 GHz band, and feeder downlinks in the 19.4-19.6 GHz band.²¹ Motorola's licensed NGSO/MSS system, Iridium, is under construction and is scheduled for launch this year. TRW was conditionally authorized to construct feeder uplinks in the 29.7-30.0 GHz frequency band, and feeder downlinks in the 19.8-20.1 GHz frequency bands.²² The 29.7-30.0 GHz band however, was eliminated from consideration as a potential MSS feeder link band as part of the preparations for the World Radio Communications Conference 1995 ("WRC-95").²³ In response to the frequency bands designated for feeder links for NGSO/MSS systems at WRC-95,²⁴ TRW Inc. submitted a proposed modification to its authorization requesting use of the 29.1-29.4 GHz band for feeder uplinks, and the 19.3-19.6 GHz for its feeder downlinks.²⁵

B. Outcome of WRC-95

22. We stated in the *Third NPRM* that the outcome of WRC-95 could affect our ability to implement the proposed band plan.²⁶ At WRC-95 the U.S. proposals, which were consistent with our proposed 28 GHz domestic band plan, were very successful. Some parties suggested that we request supplemental comments after the conclusion of WRC-95.²⁷ However, because the results of WRC-95 were consistent with our proposed band plan, as well as the band plan we adopt here, we do not think that it was necessary to do so. In any event, pursuant to our *ex parte* rules, a number of parties have addressed this issue subsequent to WRC-95.

23. Resolution 118 of WRC-95 addresses the bands 18.8-19.3 GHz and 28.6-29.1 GHz. The Conference adopted changes concerning the 18.9-19.3 GHz (downlinks) and 28.7-29.1 GHz (uplinks) bands to facilitate the operation of NGSO/FSS systems on a co-primary basis

²¹ See *Motorola Satellite Communications, Inc.*, 10 F.C.C. Rcd. 2268 (Int'l. Bur. 1995), as corrected by *Erratum*, 10 F.C.C. Rcd. 3925 (Int'l. Bur. 1995); *recon. denied* FCC 96-279 (released June 27, 1996).

²² See *TRW Inc.*, 10 F.C.C. Rcd. 2263 (Int'l Bur. 1995), as corrected by *Erratum* 10 F.C.C. Rcd. 2263 (Int'l Bur. 1995), *recon. denied* FCC 96-279 (released June 27, 1996).

²³ See *CPM Report on Technical Operational and Regulatory/Procedural Matters to be Considered by the 1995 World Radio Communication Conference*. (CPM Report), Table 15 (Geneva 1995).

²⁴ See discussion *infra* ¶ 24.

²⁵ See Amendment of Application of TRW Inc. for Modification of License, File No. 155-SAT-ML-95 (filed December 29, 1995).

²⁶ See *Third NPRM* at ¶ 66.

²⁷ Comments of GE Americom at 20; Comments of Constellation Communications at 2-3; Reply Comments of Loral/Qualcomm at 2.

with the GSO/FSS.²⁸ The other 100 MHz of spectrum in each band, 18.8-18.9 and 28.6-28.7 GHz is "frozen" internationally until WRC-97.²⁹ Resolution 118 also calls for the ITU Radiocommunication Sector (ITU-R) to study conditions for sharing between GSO and NGSO/FSS systems, between NGSO/FSS systems, and between NGSO/FSS and terrestrial systems. These studies are to be taken into account in determining whether the types of changes adopted for the 28.7-29.1/18.9-19.3 GHz bands should also be adopted in the frozen bands, and whether any other adjustments in spectrum allocations are warranted.

24. Resolution 120 of WRC-95 addresses the use of the bands 19.3-19.7 GHz and 29.1-29.5 GHz by NGSO/MSS feeder links. The Conference adopted allocation changes to facilitate use of the 19.3-19.6 GHz (downlink) and 29.1-29.4 GHz (uplink) bands for the operation of NGSO/MSS feeder links on a co-primary basis with the GSO/FSS. Studies will be performed on the other 100 MHz spectrum blocks, 19.6-19.7 GHz and 29.4-29.5 GHz with a view to similar actions in 1997.³⁰ In addition, WRC-95 adopted the U.S. proposal to permit "reverse band working" in the 19.3-19.6 GHz band for feeder links for NGSO/MSS systems.³¹

III. DISCUSSION

A. NGSO/FSS or GSO/FSS and LMDS - Co-Frequency Sharing Issues

25. In the *Third NPRM*, we tentatively concluded, based on the record at that time, that co-frequency sharing between NGSO/FSS or GSO/FSS systems and LMDS systems was not feasible.³² Many commenters agree with our tentative conclusion.³³ Some proponents of

²⁸ A principle regulatory obstacle to NGSO/FSS service is the International Telecommunication Union's (ITU) Radio Regulation 2613 (RR 2613), which requires any NGSO system to cease operations if it causes unacceptable interference into a GSO/FSS system. The Conference decided that as of 18 November 1995, RR 2613 shall not apply in the bands 18.9-19.3 GHz and 28.7-29.1 GHz.

²⁹ See Resolution 118 Final Acts of the World Radiocommunication Conference, (Geneva 1995). Internationally, "frozen" refers to the fact that the ITU's Radiocommunication Bureau will return any satellite system notifications received, or considered to be received, from any administration after 17 February 1996 and until the last day of WRC-97. Thus, the ITU frequency registration process is "frozen" during this period for systems that have not been notified previously.

³⁰ See Resolution 120 Final Acts of the WRC-95 (Geneva).

³¹ As we stated in the *Third NPRM*, reverse band working involves authorizing satellite communications links in a direction opposite to the direction for which the band is allocated. Thus, in the 19.4-19.7 GHz bands, which are allocated for downlinks, uplinks should operate on a "reverse band working" basis. See *Third NPRM* n.61.

³² See *Third NPRM* at ¶ 43.

LMDS systems in this band disagree, and contend that we should not preclude the possibility of future co-frequency sharing in the band.³⁴ For example, CellularVision suggests that the Commission adopt a mechanism that would allow it to incorporate co-frequency sharing into the band plan, should any party demonstrate that sharing is feasible.³⁵ Bell Atlantic asserts that the Commission should permit interested parties to develop the record further on this issue or negotiate co-frequency arrangements.³⁶ However, these proponents do not supply any additional technical findings on the co-frequency sharing issue and how such co-frequency operations could be implemented.

26. Hughes argues that the Commission should decline to "leave the door open" for co-frequency sharing between LMDS and FSS.³⁷ Teledesic also asserts that there has been no engineering study submitted in this proceeding demonstrating that such sharing is technically achievable.³⁸ NASA further asserts that studies by Bellcore and GeoWave have been unsuccessful in finding techniques that would allow co-frequency sharing between LMDS and satellite systems each with ubiquitous consumer terminals operating in the same geographical areas.³⁹ Comtech Associates asserts that "sharing arrangements as proposed in the Bellcore study will place unnecessary technical and financial burdens on small LMDS operators. Additionally the technical uncertainty surrounding the inability to adequately field test the necessary conditions resulting from multiple service providers in the 28 GHz band will introduce business and financial uncertainty making raising capital for service providers more difficult."⁴⁰

27. We conclude, based on the entire record before us, that co-frequency sharing between either GSO/FSS or NGSO/FSS ubiquitously deployed terminals and LMDS with its

³³ See e.g. Comments of Hughes at 31; Reply Comments of Hughes at 25; Comments of NASA at 7; Comments of ComTech Associates at 2-3; Comments of GHz Equipment Company, Inc. at 3; Comments of Teledesic at 14.

³⁴ See e.g. Comments of CellularVision at 4-5; Comments of Bell Atlantic at 3, and Comments of Endgate Corporation at 4.

³⁵ See Comments of CellularVision at 5.

³⁶ Comments of Bell Atlantic at 3.

³⁷ Reply Comments of Hughes at 25-26.

³⁸ Reply Comments of Teledesic at 4.

³⁹ Comments of NASA at 8. BellCore and GeoWave each submitted studies after the conclusion of the NRMC, that they contend demonstrate that co-frequency sharing between LMDS and FSS systems is possible. For summaries of the BellCore and GeoWave studies see *Third NPRM* ¶¶ 40-43.

⁴⁰ Comments of Comtech Associates at 3.

ubiquitously deployed subscriber terminals, is not feasible at this time.⁴¹ At this time no party has demonstrated the feasibility of sharing, and our conclusion in the *Third NPRM* was clearly supported by the record to date. However, if future technology becomes available to facilitate this type of sharing we would consider revisiting this conclusion.

28. We also deny Qualcomm Incorporated's request to reopen the record in this proceeding, on a limited basis, for supplemental comments on sharing issues among NGSO/FSS systems.⁴² Teledesic opposes this request. QualComm's Petition raises issues directly relating to intra-service sharing and licensing policies for NGSO/FSS systems. A forthcoming *Report and Order* will address NGSO/FSS service rules and we do not believe that the adoption of the domestic band segmentation plan precludes the possibility of sharing between NGSO/FSS systems. Therefore, we conclude that reopening the formal comment period in this proceeding is not warranted. Consistent with our *ex parte* rules,⁴³ several parties have filed comments after the formal comment deadline.

B. Services above 40 GHz

29. In the *Third NPRM*, we also tentatively concluded that the 40.5-42.5 GHz ("40 GHz band") is not currently suitable for either the LMDS or fixed satellite services, as proposed in this docket.⁴⁴ Many LMDS proponents agree with our tentative conclusion.⁴⁵ CellularVision, for example, contends it and other parties demonstrated in comments in ET Docket 94-124⁴⁶ that based on "significant differences in signal propagation characteristics, component technology and system implementation, the cost of providing LMDS service at 40 GHz would be significantly more expensive than the cost at 28 GHz, thus rendering 40 GHz LMDS

⁴¹ Andrew Corporation claims its prototype conical antenna facilitates co-frequency sharing. See Comments of Andrew Corporation at 3. Pacific Telesis asserts that system proponents consider the antenna in system designs, but the Commission should not consider an additional period of negotiations and evaluations. Reply Comments of PacificTelesis at 2. Hughes argues that this antenna is "unproven" and the technical data submitted with Andrew's Comments provides no support for its conclusion that LMDS and GSO/FSS can share the spectrum. Reply Comments of Hughes at 25. The record demonstrates that co-frequency sharing between LMDS and FSS is a multifaceted problem. We believe that the antenna silo performance Andrew claims to fix is only one aspect of the sharing problem and alone does not permit us to determine that co-frequency sharing is feasible.

⁴² See *Petition for Supplemental Comments of QualComm, Incorporated* CC Docket No. 92-297, (filed Feb. 28, 1996).

⁴³ See generally, 47 C.F.R. § 1.1206.

⁴⁴ See *Third NPRM* at ¶¶ 36-38.

⁴⁵ Comments of CellularVision at 5.

⁴⁶ *In the Matter of Parts 2, 15, and 97 of the Commission's Rules to Permit Use of Radio Frequencies Above 40 GHz for New Radio Applications*, (NPRM), 9 F.C.C. Rcd. 7078 (ET Docket No. 94-124).

commercially unviable."⁴⁷ However, GHz Equipment Company, a manufacturer of equipment for MMDS video distribution, asserts that it can produce inexpensive analog equipment at 40 GHz and further asserts that digital delivery systems are being tested by GHz Equipment and can be accommodated in this spectrum. It indicates, however, that digital equipment will cost significantly more with today's pricing regardless of the spectrum band employed.⁴⁸ Moreover, some LMDS proponents envision that specialized terrestrial services may become suitable for the 40 GHz band in the future, as technology advances and 40 GHz equipment is developed and becomes commercially available.⁴⁹

30. NASA asserts that the principal accommodation of LMDS should be in the 40 GHz band.⁵⁰ NASA argues that the Commission erred in its conclusion based on representations of 28 GHz LMDS proponents which claim LMDS is not viable at 40 GHz,⁵¹ and that many telecommunications and technology development companies in the country assert that technology is readily available to develop LMDS in the 40 GHz frequency band.⁵² TRW contends that the Commission failed to provide a rational basis for its tentative conclusion that locating LMDS at 40 GHz is not feasible.⁵³ Lockheed Martin and GE Americom assert that the record has not demonstrated that the cost increase of providing LMDS in the 40 GHz band would make LMDS service prohibitive.⁵⁴ TRW and GE Americom also suggest that the 40 GHz band provides an alternative for LMDS if the 28 GHz band sharing issues cannot be worked out.⁵⁵

31. The record indicates that equipment for provision of LMDS is already available in the near term for the 28 GHz bands, while substantial additional development and costs would be required for implementation of this service in the 40 GHz band. In light of our recognition of

⁴⁷ Reply Comments of CellularVision at 15.

⁴⁸ Comments of GHz Equipment Company at 3.

⁴⁹ Comments of CellularVision at 5-6; Comments of Comtech at 2; Comments of Pacific Telesis at 2.

⁵⁰ Comments of NASA at 1.

⁵¹ NASA comments at 9.

⁵² *Id.* at 12. NASA contends that the 40 GHz spectrum is not suitable for FSS. It asserts that LMDS systems, by their terrestrial nature can compensate for differences in rain attenuation across different rain zones by varying their cell sizes and thereby varying the path length through the rain. Satellites on the other hand, must traverse the same path length through the atmosphere at a given elevation angle for all rain zones. *Id.* at 14.

⁵³ Comments of TRW at 35.

⁵⁴ Comments of Lockheed Martin at 3; Comments of GE Americom at 19.

⁵⁵ Comments of TRW at 37; Comments of GE Americom at 18.

LMDS as a potential source of competition in the local telephony and multi-channel video programming distribution ("MVPD") markets, we believe it is important to immediately authorize deployment of LMDS. While the 40 GHz band may prove useable in the longer term for some or all of the types of services proposed by LMDS, or satellite services, we make no decisions here regarding use of the 40 GHz band. Rather, we will address such uses in the pending above 40 GHz proceeding.⁵⁶

C. Band plan proposed in the Third NPRM and Alternative Band Plans Considered

1. Third NPRM

32. The band plan proposed in the *Third NPRM* was the result of months of discussions with interested parties and filings in the proceeding. Specifically, we proposed to segment the 28 GHz band by designating 1000 MHz each for LMDS and GSO/FSS systems; 500 MHz for NGSO/FSS systems; and 400 MHz for MSS feeder links. We proposed sharing in 150 MHz between NGSO/MSS feeder links and LMDS at 29.1-29.25 GHz, with a prohibition on subscriber-to-hub transmissions for LMDS systems. We also proposed sharing in 250 MHz between GSO/FSS systems and NGSO/MSS feeder links at 29.25-29.5 GHz. We proposed coordination between these systems on a "first-come-first served" basis.⁵⁷ We also indicated in the *Third NPRM* that we may authorize the feeder links of at least one NGSO/MSS system, TRW, on a reverse band working basis in the 19.4-19.7 GHz band.⁵⁸ The band plan as proposed in the *Third NPRM* is represented as follows:

LMDS fss	GSO/FSS ngso/fss	NGSO/FSS gso/fss	MSS FEEDER LINKS & LMDS (h-s) 150 MHz	MSS FEEDER LINKS & GSO/FSS	GSO/FSS ngso/fss
850 MHz	250 MHz	500 MHz	150 MHz	250 MHz	500 MHz
27.5	28.35	28.60	29.1	29.25	29.5
					30.0

33. The majority of commenters supported our proposed band plan as a reasonable compromise to accommodate all proposed services in the band. However, commenters did

⁵⁶ *Supra* note 46.

⁵⁷ *See Third NPRM* at ¶ 64.

⁵⁸ *See supra* note 31 for definition of reverse band working.

submit alternative band plans and other suggested modifications to our proposal.⁵⁹ Many parties, as requested in the *Third NPRM*, also submitted analyses on specific technical sharing issues raised by the band plan.⁶⁰ Commission staff met repeatedly with representatives of both satellite and LMDS proponents to discuss concerns regarding specific sharing proposals, particularly within the 29.1-29.5 GHz band segment.⁶¹

34. We proposed to designate the 29.1-29.25 GHz band segment for assignment to NGSO/MSS feeder links and LMDS systems on a co-primary basis. For this 150 MHz we based our proposed sharing criteria on an agreement reached by Motorola, CellularVision and Texas Instruments with respect to frequency sharing during the NRMC.⁶² This agreement provided that subscriber transceivers would not be permitted to transmit in this shared band. We also proposed specific sharing rules for hub-to-subscriber transmissions in this 150 MHz.⁶³ Nevertheless, we did suggest in the *Third NPRM* that it may be possible to permit LMDS subscriber-to-hub transmissions in the 150 MHz of the shared spectrum under certain sharing criteria.⁶⁴ We specifically requested comment on whether, and, if so, the extent to which, sharing methods may be used to permit two-way LMDS operations in the 150 MHz shared with MSS feeder links.⁶⁵

35. We received extensive comments on sharing in the 29.1-29.25 GHz segment. Motorola asserts that the restriction on LMDS subscriber-to-hub traffic is necessary for the unimpeded operation of the Iridium system feeder links.⁶⁶ Several LMDS proponents argue that the Commission should not adopt any restrictions on subscriber equipment transmitting in the 150 MHz shared band and view the proposed rules as unreasonably encumbering LMDS operations.⁶⁷ Specifically, the prohibition of subscriber-to-hub transmissions may effectively

⁵⁹ See e.g. Comments of Hughes Communications Galaxy; Comments of NASA; Comments of Telecommunications Industry Association; and Comments of GE Americom.

⁶⁰ See e.g. Joint Comments of Motorola Satellite Communications, Inc. and Iridium, Inc., Comments of Hughes Communications Galaxy, Inc., Comments of Texas Instruments, and Comments of TRW Inc.

⁶¹ All such *ex parte* discussions are documented in CC Docket 92-297.

⁶² See Report of the LMDS/FSS 28 GHz Band Negotiated Rulemaking Committee, Addenda.

⁶³ See *Third NPRM* at Appendix B.

⁶⁴ See *Third NPRM* at ¶ 63.

⁶⁵ *Id.*

⁶⁶ Joint Comments of Motorola Inc. and Iridium, Inc. at 3.

⁶⁷ See Comments of BellSouth Corp., BellSouth Telecommunications, Inc. & BellSouth Enterprises, Inc. at 5; Comtech Associates, Inc. at 2; Comments of Endgate Corporation at 2; Comments of Hewlett-Packard Company at 4; Comments of Northern Telecom Inc. at 5; Comments of Nynex Corporation at 4; Comments

eliminate the ability of interactive LMDS communications in this portion of the 1000 MHz designated for LMDS. Moreover, Texas Instruments asserts that using part of the 27.5-28.35 GHz band for return links would require a 120 MHz guardband between hub-to-subscriber and subscriber-to-hub links at the same cell site to be implemented in this 850 MHz, leaving only 730 MHz of useful spectrum for LMDS forward and return links.⁶⁸ Texas Instruments also asserts that in addition to the guardband a diplexer⁶⁹ (costing between \$70-\$100) would be required in each subscriber's equipment to implement the return link.⁷⁰

36. Texas Instruments, Hewlett Packard and Endgate Corporation also submitted analyses which they assert demonstrate that LMDS subscriber stations in the 29.1-29.25 GHz band would not cause unacceptable interference to Iridium MSS feeder uplink receivers.⁷¹ Motorola filed reply comments contending that the analyses were based on "a series of faulty technical and behavioral assumptions."⁷²

37. The Commission facilitated discussions among interested parties trying to reach a sharing arrangement that would permit subscriber-to-hub transmissions in the 150 MHz band segment. After months of extensive discussions, the parties failed to agree on a mutually acceptable sharing arrangement.⁷³ We agree with the parties that, at this time, undesirable constraints would need to be placed on either Motorola's NGSO/MSS system feeder links or LMDS subscriber-to-hub links in order to permit sharing in this 150 MHz band segment.⁷⁴ Should the parties in the future agree that LMDS return links can operate here in this band under mutually acceptable sharing criteria with NGSO/MSS licensees and applicants, we would reconsider the LMDS uses in this band segment.

of Pacific Telesis Wireless Broadband Services at 2; Comments of Texas Instruments at 7, and Comments of Titan Information Systems Corporation at 3; Joint Comments of the Association of America's Public Television Stations (APTS) and Public Broadcasting Service (PBS); Comments of M3 Illinois Telecommunications Corporation at 2.

⁶⁸ Comments of Texas Instruments at 7.

⁶⁹ A diplexer is a device that allows equipment to transmit and receive in the same frequencies.

⁷⁰ Comments of Texas Instruments at 7.

⁷¹ See Comments of Texas Instruments at Appendix A; Comments of Hewlett Packard at Appendix B and Comment's of Endgate at 2-4.

⁷² Joint Reply Comments of Motorola Satellite Communications, Inc. and Iridium, Inc. at 5.

⁷³ However, TRW, because of different system parameters than Motorola, was able to develop sharing principles with LMDS in the subscriber-to-hub direction. See Letter from Stephen D. Baruch (Counsel, TRW) to William F. Caton (June 3, 1996).

⁷⁴ We also reject Nynex Corporation's suggestion that we refer the record, the NRMCM information and post-NRMCM *ex parte* proposals, to an independent Technical Advisory Committee for further development. Comments of Nynex at 7-8.

2. Commission Band Segmentation Options Considered

38. The Commission considered various band segmentation plans over the last several months with the goal of accommodating the various divergent proposals made in response to the band plan proposed in the *Third NPRM*.⁷⁵ For example, we considered plans which ultimately proved to require difficult inter-service sharing rules and to not completely support interactivity of LMDS systems.⁷⁶ We also considered a band plan that designated 1000 MHz each for GSO/FSS and LMDS service. That plan, however, would have divided LMDS among three non-contiguous spectrum segments.⁷⁷ This option was not acceptable to the potential LMDS service providers because, they argued, it would have significantly decreased spectrum efficiency for LMDS, resulting in increased cost and delay in offering both subscriber and hub equipment.⁷⁸ We also considered two band plans that designated GSO/FSS systems with less than 1000 MHz.⁷⁹ These options were unacceptable to the GSO/FSS applicants because, they argued, any of these plans would result in a significant loss of system capacity and revenue.⁸⁰ Another plan, resulting from a GSO/FSS applicant's proposal, was also considered. It would have designated a total of 1010 MHz to GSO/FSS applicants and 985 MHz to LMDS, but required sharing of 135 MHz between GSO/FSS and LMDS.⁸¹ However, the mutually acceptable sharing principles required to implement this

⁷⁵ See *ex parte* submission filed by the International Bureau to William F. Caton, (Feb. 6, 1996) for diagrams of Commission Band Plan Options 1, 2, 2A, 2B, 3(a), 4 and 5. See *ex parte* submission filed by the International Bureau (March 5, 1996) for diagram of Option 4 prime.

⁷⁶ See Options 2, 2(a), and 2(b).

⁷⁷ See Option 5.

⁷⁸ See letter from representatives of Endgate Technologies, Hewlett-Packard, and Texas Instruments to William F. Caton (March 6, 1996). See also letter from Michael R. Gardner (Counsel, CellularVision) to Scott Blake Harris (Chief, International Bureau) and Michele Farquhar (Chief, Wireless Telecommunications Bureau) (March 6, 1996).

⁷⁹ See Options 3(a) and 4.

⁸⁰ See *ex parte* letter from representatives of Hughes, AT&T, Lockheed Martin, GE and Loral to Scott Blake Harris and Michele Farquhar (February 28, 1996). Option 4 also reduces the amount of usable spectrum available to Motorola by 50% and severely impacts its system's communications link of "last resort" for the control of the satellite. See Letter from Michael D. Kennedy (Vice President and Director, Regulatory Relations, Motorola) to William F. Caton (February 22, 1996).

⁸¹ See Option 4 prime. See also Letter from Thomas K. Gump (Counsel, Lockheed Martin) to William F. Caton (February 23, 1996) "Option 4A." However, Option 4A involved the sharing of only 75 MHz of spectrum with LMDS.

plan were not developed by the LMDS and GSO/FSS parties.⁸² We were also unable to successfully propose sharing criteria.

39. In March 1996, NASA was also asked to undertake an immediate study to assess whether its space services and LMDS could share spectrum below 27.5 GHz.⁸³ NASA concluded three weeks later that no rules acceptable to all parties could be drafted which would guarantee protection of NASA space services from harmful interference.⁸⁴ NASA also concluded that coordination with other space service systems in the band from other administrations would make this a difficult option to implement effectively. Texas Instruments requests that we decide, as part of this *Report and Order* "to reopen discussions with NTIA to reexamine the federal spectrum requirements and the possibilities for federal/non-federal sharing in or reallocation of the 25.25-27.0 GHz and 27.0-27.5 GHz bands and to pursue those discussions at the earliest possible time."⁸⁵ Notwithstanding NASA's initial conclusions on sharing, and the band plan we adopt today, we agree that more in-depth sharing studies of fixed services and LMDS and Government spectrum below 27.5 GHz may yield more positive results. Accordingly, we direct the staff to continue discussions with NTIA through the Interdepartment Radio Advisory Committee (IRAC) process to explore the feasibility of shared use or reallocation of some portion of this band from the Government for commercial usage.

40. We conclude that many of the alternative band plans described above fail to provide adequately for the operational needs of one or more of the proposed systems. We find, based on the record and for the reasons discussed below, that the band plan proposed in the *Third NPRM*, along with the additional inter-service sharing rules, is the most reasonable compromise to allow all proposed systems in the 28 GHz band to be authorized. In addition, we adopt a *Fourth Notice of Proposed Rulemaking* proposing that the 31.0-31.3 GHz band be designated for LMDS use. We propose that potential LMDS service providers be able to use this additional spectrum to meet the interactive needs of some of the proposed LMDS technologies. We are aware that some LMDS proponents oppose, for a variety of reasons,

⁸² See Letter from Charles M. Kupperman (Vice President, Washington Operations, Space and Missiles Sector, Lockheed Martin) to William F. Caton (June 3, 1996). Hughes also argues that the primary consequences of adopting Options 4 or 4 Prime would be (i) delay in provision of broadband satellite service in the U.S. (ii) significantly decreased service capabilities, and (iii) increased cost to consumers. See Letter from Edward J. Fitzpatrick, (Vice President of Hughes Communications) to Chairman Hundt and the Commissioners (March 15, 1996).

⁸³ Frequencies in this range are currently allocated for government use.

⁸⁴ See Letter from Charles T. Force (Associate Administer for Space Communications, NASA) to Mr. Lionel S. Johns (Associate Director of Technology, Office of Science and Technology Policy), and enclosure *Feasibility of Sharing between NASA Space Systems and LMDS systems near 27 GHz* (April 17, 1996).

⁸⁵ See, e.g., Letter from Robert L. Pettit (Counsel, Texas Instruments) to Chairman Hundt and Commissioners (July 9, 1996).

any plan proposing to designate LMDS in the 31 GHz band.⁸⁶ However, we believe adopting this band plan along with the *Fourth Notice of Proposed Rulemaking, infra* Part IV, is in the public interest and will hasten the availability of all proposed services to consumers.⁸⁷

D. Commission Band Segmentation Decision for the 27.5-30.0 GHz Band

41. We adopt this band segmentation plan with the following objectives in mind:
- Ensuring consistency with international and domestic allocation decisions, as set forth in the ITU and FCC Tables of Allocations;
 - Providing for coordination of new systems with existing services in the band;
 - Designating discrete band segments for services which do not appear capable of sharing at this time; and
 - Providing maximum flexibility for system implementation, inter-system sharing, and future system growth.

⁸⁶ See Letter from Paul E. Misener (Counsel, Texas Instruments) to William F. Caton (April 26, 1996); Letter from Mickey R. Gardner (Counsel, CellularVision) to Robert James (Wireless, Telecommunications Bureau, FCC) (March 29, 1996); Letter from Douglas A. Gray (Program Manager, Hewlett Packard) to Bob James (March 29, 1996); Letter from Douglas A. Gray to Jennifer Warren (Wireless Telecommunications Bureau, FCC) (June 18, 1996); Letter from Robert L. Pettit (Texas Instruments) to Chairman Hundt and Commissioners, (June 19, 1996). *But see* Letter from Douglas Gray to Jennifer Warren (May 17, 1996).

⁸⁷ Many parties to the proceeding support adoption of *Third NPRM* band plan. See letter to Chairman Hundt and Commissioners, signed by representatives of CellularVision USA, Inc.; AT&T; Hughes Communications Galaxy, Inc.; Teledesic Corporation; Motorola, Inc.; The University of Texas - Pan American; Philips Electronics North America Corporation; Titan Information Systems; CellularVision of New York, L.P.; M/A COM, Inc.; RioVision of Texas, Inc.; International CellularVision Association; CellularVision Technology & Telecommunications, L.P.; Ge American Communications, Inc., (June 3, 1996). See also letters, supporting adoption of *Third NPRM* band plan and the 31 GHz option, from: R. Gerard Salemme (Vice President, AT&T) to Chairman Hundt (May 31, 1996); John P. Janka (Counsel, Hughes) to William F. Caton (May 30, 1996) and Charles M. Kupperman (Vice President, Lockheed Martin) to William F. Caton (June 3, 1996).

42. The Commission's band segmentation plan is depicted graphically as follows:

Uplink Band 27.5 - 30.0 GHz

LMDS fss	GSO/FSS ngso/fss	NGSO/FSS gso/fss	MSS FEEDER LINKS & LMDS (h-s)	MSS FEEDER LINKS & GSO/FSS	GSO/FSS ngso/ fss	G O V T	LMDS** (h-to-s) (s-to-h)	
850 MHz	250 MHz	500 MHz	150 MHz	250 MHz	500 MHz		300 MHz	
27.5	28.35	28.60	29.1	29.25	29.5	30.0	31.0	31.3 GHz

43. The plan we adopt designates co-frequency sharing in band segments where the Commission and the parties have concluded it is technically feasible. We conclude that adoption of this band plan promotes spectrum efficiency and facilitates the deployment of diverse, interactive, competitive services for consumers.⁸⁹

44. The band segmentation plan will be implemented through appropriate changes in Part 25 and Part 101 of our rules. We are designating discrete spectrum bands for specific types of systems. Services designated for domestic licensing priority are specified in capital letters in the graphic depiction of the band plan. These services have licensing priority vis-a-vis any other type of service allocated domestically or internationally in the band. Lower-case letters indicate services in a particular band segment which also have licensing priority vis-a-vis any third service allocated domestically or internationally in the band, but have no licensing priority over the service in capital letters in the band segment and must operate on a non-interference basis and must accept interference vis-a-vis that service.⁹⁰ Services designated with two priority users have equal licensing rights based on the sharing principles adopted for that particular band segment. See discussion *infra* ¶¶ 63-74 on sharing.

⁸⁸ See *infra* Part IV *Fourth Notice of Proposed Rulemaking* on 31 GHz band.

⁸⁹ Although some parties have pointed out to the Commission the potential of raising substantial revenues from auctions in discussions of the various band plans, the Commission, pursuant to 47 U.S.C. § 309(j)(7)(A), may not consider auction revenues in making spectrum allocation determinations and has not done so in this proceeding.

⁹⁰ Teledesic recommends that the Commission adopt a local priority designation for LMDS in the band segment proposed for LMDS rather than amend the domestic table of frequency allocations to establish a primary or co-primary designation for LMDS. Comments of Teledesic at 6. However, since we are not amending the domestic table of frequency allocations, it is necessary to adopt domestic priority designations not just for LMDS, but for NGSO/FSS, GSO/FSS and MSS feeder links.

1. Primary LMDS Spectrum

45. We designate 1000 MHz of spectrum for LMDS systems in two non-contiguous segments. At 27.5 - 28.35 GHz we designate 850 MHz for LMDS on a primary basis. GSO/FSS or NGSO/FSS systems will be permitted on a non-interference basis to the LMDS systems in the 850 MHz band segment, for the purpose of providing limited gateway-type services. We designate another 150 MHz of spectrum at 29.1-29.25 GHz for LMDS transmissions, in the hub-to-subscriber direction, on a co-primary basis with NGSO/MSS feeder links.⁹¹ We also propose to designate 300 MHz at 31.0-31.3 GHz for additional LMDS use. See *Fourth Notice of Proposed Rulemaking infra* Part IV.

46. Many LMDS proponents assert that 1000 MHz, with no restriction on subscriber-to-hub or hub-to-subscriber transmissions, is the minimum amount of spectrum necessary to provide a competitive interactive LMDS service.⁹² We conclude that some planned LMDS services and equipment can be supported within this 1000 MHz of spectrum.⁹³ Furthermore, this band plan combined with the proposed use of the 31 GHz band will ensure that a greater array of proposed LMDS systems can be accommodated. In the *Third NPRM*, we also tentatively concluded that we could not designate more than 850 MHz of contiguous spectrum to LMDS at the lower end of the band, and noted that designating the additional 150 MHz requested by LMDS proponents at 29.1-29.25 GHz would be a reasonable compromise.⁹⁴

47. GE Americom suggests that the Commission offer some protection to FSS gateways operating in the 27.5-28.35 GHz band segment. Specifically GE Americom requests "that if an FSS provider selects and coordinates a gateway site with existing LMDS operations, it will not be required to terminate its gateway operations if an LMDS licensee subsequently adds a station within the gateway's potential interference zone."⁹⁵ Some LMDS

⁹¹ See discussion on sharing *infra* at ¶¶ 67-71.

⁹² Comments of Bell Atlantic at 2; Comments of BellSouth at 6; Comments of CellularVision at 3; Comments of ComTech Associates, Inc. at 2; Comments of GHz Equipment Company, Inc at 2; Comments of Texas Instruments at 11. *But see*, Comments of GTE at 2-3 "LMDS can (and will be) viable and competitive with considerably less than 1 GHz of spectrum. GTE believes other factors are just as important as the amount of spectrum and must be taken into consideration in designing a proper structure for LMDS."

⁹³ NASA, however, asserts that the introduction of LMDS into the 27.5-29.5 GHz band is inconsistent with global use of FSS allocations. Comments of NASA at 3. In the absence of a global decision on the fixed service allocation in the 27.5-29.5 GHz band, we see no inconsistency warranting prohibition of LMDS service in these bands.

⁹⁴ *Third NPRM* at ¶ 50.

⁹⁵ Comments of GE Americom at 18.

proponents voiced concern over secondary FSS gateway operations at 27.5-28.35.⁹⁶ For example, Endgate Corporation believes it would be appropriate for the Commission to require the FSS system operator to notify the existing LMDS operator of its intention to install a "gateway" station and to coordinate with the LMDS operator to prove non-interference before the installation.⁹⁷ CellularVision believes the Commission should make clear that in order to operate a gateway station on a secondary basis, an FSS proponent first would have to demonstrate that it would not cause interference to the operations of the primary user in that band, the LMDS licensee, and if such FSS operations ever did cause interference to the primary user, LMDS, the FSS operator would have the burden to resolve the interference or cease operations.⁹⁸

48. We reject GE Americom's proposal that the Commission offer some protection to FSS gateways operating in the 27.5-28.35 GHz band segment. GE Americom's proposal is inconsistent with the designation of FSS for secondary licensing priority in the 27.5-28.35 GHz band and potentially deprives LMDS of its domestic priority designation. If proponents of FSS systems implement gateways in this part of the band, it will be on a non-interference basis to LMDS, and accordingly these systems will not be able to claim protection against harmful interference from LMDS operators.

49. We also reject GE Americom's proposal that NGSO/MSS feeder links be given a co-primary allocation within the 27.5-28.35 GHz band designated for LMDS, pursuant to the sharing arrangement that has been worked out between those parties in the Negotiated Rulemaking.⁹⁹ Such a co-primary allocation would be inconsistent with international allocations, in that no specific provision has been made in the international frequency allocation tables for operation of NGSO/MSS feeder links in the 27.5-28.35 GHz band. Furthermore, even assuming the associated international coordination issues of such a proposal could be adequately addressed, co-primary operations would impose operational constraints on both LMDS systems and NGSO/MSS feeder links.

50. Teledesic recommends that all authorized users of the 28 GHz band be required to utilize digital technology.¹⁰⁰ CellularVision filed reply comments contending that it and

⁹⁶ Comments of Endgate Corporation at 1; Reply Comments of CellularVision at 11; Reply Comments of Comtech at 6.

⁹⁷ Comments of Endgate Corporation at 1.

⁹⁸ Reply Comments of CellularVision at 11.

⁹⁹ Comments of GE Americom at 3.

¹⁰⁰ See Comments of Teledesic at n.2 citations omitted. GHz Equipment Company also contends that spectral efficiency beyond analog delivery should be required by the Commission. Comments of GHz Equipment Company at 3. See also Reply Comments of ComTech Associates at 2 "both proponents of digital and analog LMDS systems remain clear in their need for 1,000 MHz."

other LMDS proponents may implement digital compression if and when it becomes available commercially.¹⁰¹ CellularVision also asserts that it has been established in this proceeding that digital technology is not commercially feasible today for LMDS operations.¹⁰² This issue will be addressed fully in the satellite and LMDS service rules, respectively.

a. *Grandfathering CellularVision's NYPMSA License*

51. In the *Third NPRM*, we proposed to include, as a condition of CellularVision's PMSA license renewal,¹⁰³ a provision permitting CellularVision to operate on the contiguous 1 GHz for which it is presently licensed for a period of 36 months following the release date of this Order, or until the first GSO satellite operating in this spectrum is launched, whichever occurs later.¹⁰⁴ We further proposed to condition the license upon a provision specifying that at the end of the grandfather period, CellularVision's license would become subject to our generally applicable rules for the provision of LMDS service. Thus, at that time, CellularVision would be required to cease operation in the 150 MHz designated for GSO/FSS operations in the 28.35-28.50 GHz band. Simultaneously, it would be permitted to operate in the 150 MHz at 29.1-29.25 GHz.

52. CellularVision, Bell Atlantic, and Titan filed comments in support of our grandfather proposal. With regard to the termination period for the grandfathering provision, CellularVision requests clarification that the Commission's definition of "launched" contemplates the point at which a satellite is actually put into service.¹⁰⁵ It notes that there is typically a period of several months between the launch of a satellite and its inauguration of service. CellularVision argues that to require it to migrate from the spectrum prior to that point would be unnecessary.¹⁰⁶

53. Some GSO/FSS entities expressed concern that this proposal would allow CellularVision to interfere with deployment of their operations. Hughes asserts that the grandfathering provision as proposed could provide an incentive for CellularVision to stall the licensing of GSO/FSS systems in order to provide a longer transition period for itself.¹⁰⁷

¹⁰¹ Reply Comments of CellularVision at 22.

¹⁰² *Id.*

¹⁰³ We anticipate processing the CellularVision renewal application at, or shortly after, the time generally-applicable LMDS service rules are adopted.

¹⁰⁴ *Third NPRM* at ¶ 72.

¹⁰⁵ Comments of CellularVision at 10.

¹⁰⁶ *Id.* at 11.

¹⁰⁷ Comments of Hughes at 30.

Hughes argues that it is critical that the Commission establish a definitive deadline for this transition that is not subject to change or exception. Hughes states that its investors and lenders "require comfort" that the satellite launch will not be hindered by further regulatory delays. Hughes argues that the Commission should adopt a three-year transition period for CellularVision and make clear that it will not consider any exceptions or extensions.¹⁰⁸ GE Americom agrees with Hughes, and believes the Commission must adhere to its deadline for CellularVision to vacate this spectrum so that CellularVision's operation in the New York service area will not be permitted to interfere with the development of GSO/FSS services.¹⁰⁹ Orion claims it is conceivable that CellularVision would attempt to leverage its position as a service provider to existing subscribers to persuade the Commission to remove the time limit on its temporary use of the 150 MHz from 28.35-28.50.¹¹⁰

54. It is our intention to facilitate the development of LMDS in New York and the rest of the nation, as well as the deployment of GSO/FSS systems. We recognize that permitting CellularVision to proceed with its business plan and existing system design in the contiguous 1 GHz for which it was originally licensed will help ensure a seamless transition for CellularVision's customers as LMDS is licensed pursuant to the band plan implemented in this *Report and Order*. We also recognize the concerns of potential GSO/FSS licensees that CellularVision's operations in the band may interrupt implementation of GSO/FSS systems designated for the band. Accordingly, in order to ensure certainty for both CellularVision's customers and for potential GSO/FSS systems planning to provide service in the United States in the 28.35-28.50 GHz band, we clarify our reference to "launch" as the date which the first GSO/FSS satellite, intended to operate in the 28.35-28.50 GHz band, leaves the Earth's surface. The satellite licensee is responsible for notifying CellularVision six months prior to the planned launch date, and for giving CellularVision, upon its request, updates on the satellite's status. CellularVision has the responsibility to remain apprised of the satellite's status and to ensure that LMDS operations cease on the 150 MHz allocated for GSO/FSS operations in accordance with the order herein. With these safeguards provided by this clarification, we do not believe that the concerns expressed by some of the GSO/FSS applicants regarding interference from LMDS operations will be realized.

55. We also find it necessary to adjust the amount of time for which CellularVision will be grandfathered from our proposal in the *Third NPRM*. Instead of 36 months, we find that 24 months from the release date of this *Report and Order*, or by the date of launch of the first GSO/FSS satellite, whichever occurs later, is appropriate. Our reasons for this finding are that the time proposed in the *Third NPRM* was intended to coincide approximately with the expected launch date of the first GSO/FSS satellite proposed for this band. At that time, launch was expected in approximately three years. Due to delays in adjusting the band

¹⁰⁸ *Id.*

¹⁰⁹ Reply comments of GE Americom at 17-18.

¹¹⁰ Reply Comments of Orion Network Systems at 10-11.

segmentation plan for the 28 GHz band, a full year has passed since adoption of the *Third NPRM*. Since we intend to facilitate both LMDS and the GSO/FSS applicants for the 28 GHz band, we find that it is reasonable to grandfather CellularVision for the same benchmark, i.e., the expected launch of the first GSO/FSS satellite. Since that projected launch date has not changed, we believe it is fair to set the sunset period for 24 months from the release date of this *Report and Order*. Moreover, we do not believe that this decision results in unfairness to CellularVision because its expansion applications have been granted, and CellularVision has had the authority to build out its system throughout the NYPMSA on its original authorization of 1 GHz at 27.5-28.5. The same expansion which would have been possible under the grandfather provision has been available to CellularVision for this length of time. Therefore, we require CellularVision to vacate the 28.35-28.50 GHz band by 24 months following the release date of this *Report and Order*, or by the date of launch of the first GSO/FSS satellite intended to provide service in the United States in this band, whichever occurs later.

b. Effect of Band Segmentation on CellularVision's NYPMSA License

56. The effect of this band plan is to require CellularVision to transition to the non-contiguous spectrum designated in this *Report and Order*, which may necessitate retuning or replacing existing equipment. As a result, we believe it is appropriate to facilitate CellularVision's transition to the band plan we adopt today by authorizing its concurrent use of its authorized 1 GHz at 27.5-28.5 GHz and the newly designated 150 MHz at 29.1-29.25 for hub-to-subscriber transmissions during the grandfathered period.

2. Primary GSO/FSS Spectrum

57. We designate 750 MHz of exclusive primary spectrum for GSO/FSS systems, in two non-contiguous segments at 28.35-28.60 GHz and 29.5-30.0 GHz. NGSO/FSS systems will have secondary status in these segments. We also designate GSO/FSS use for 250 MHz on a co-primary basis with NGSO/MSS feeder links at 29.25-29.5 GHz.¹¹¹

58. In the *Third NPRM* we stated that broadband satellite applications require more bandwidth than current data operations, and that 1000 MHz of spectrum is needed to support multiple 28-GHz band GSO/FSS systems. NASA and Loral Space Communications, Ltd. (Loral) contend that GSO/FSS systems require more than 1000 MHz of 28 GHz band spectrum.¹¹² Several GSO/FSS proponents have indicated that 1000 MHz of 28 GHz spectrum, free from technical constraints, is the minimum amount of spectrum needed to

¹¹¹ See discussion on sharing issues *infra* ¶¶ 72-74.

¹¹² PanAmSat Corporation suggests that the entire Ka-band should be allocated to satellite services. Comments of PanAmSat at 2. CellularVision argues that PanAmSat provides no basis for exclusion of LMDS from the band and that Loral's plan to give FSS 1.25 GHz of contiguous spectrum does not provide justification. Reply Comments of CellularVision at 8-9.

operate commercially viable GSO/FSS systems.¹¹³ Although we designate 250 MHz on a shared basis with NGSO/MSS feeder links, we find that broadband GSO/FSS applications proposed for this band can be supported within our total designation of 1000 MHz.

3. Primary NGSO FSS Spectrum

59. Consistent with the band plan proposed in the *Third NPRM*, the U.S. position at the WRC-95, and our intention to continue to propose 500 MHz for NGSO/FSS at WRC-97, we designate 500 MHz at 28.6-29.1 GHz for NGSO/FSS systems. Until such time as studies are completed in the ITU-R,¹¹⁴ we cannot conclude that co-frequency sharing is possible between GSO/FSS systems and NGSO/FSS systems and therefore a separate band designation is warranted.¹¹⁵ We believe designating 500 MHz is necessary to accommodate the increasing worldwide demand for 28 GHz spectrum for NGSO/FSS systems.¹¹⁶ Significantly, this 500 MHz designation preserves the possibility that competitive NGSO/FSS systems may be implemented in this band.

60. Accordingly, we reject TRW's request that we defer consideration of an NGSO/FSS designation until we determine whether to grant an authorization to the sole currently pending domestic applicant for an NGSO/FSS system.¹¹⁷ In view of the fact that we are adopting designations for a number of different types of services, we decline to forego adopting a designation when that action is both contrary to the international allocation in this band and could be perceived as foreclosing competitive systems proposed by other countries.

61. In its comments, Teledesic also recommends that the Commission designate use of the 28.6-29.1 GHz and 18.8-19.3 GHz bands for both FSS and MSS.¹¹⁸ Hughes

¹¹³ See Comments of GE Americom at 5-6; Reply Comments of GE Americom at 2-3; Comments of Hughes at 3; Comments of Orion Network Systems at 2-3; Reply Comments of Orion Network Systems at 3. In the comments, some satellite proponents contend that the non-contiguous nature of the GSO/FSS spectrum, as proposed in the *Third NPRM*, also adds complexity and cost to system design. Comments of Loral at 3, Reply Comments of GE Americom at 6-7 and Reply Comments of Orion at 3-4. See also ex parte letter from Stephen L. Goodman, Counsel to AT&T, to Scott Blake Harris and Michele C. Farquhar (March 7, 1996) and Letter from Edward J. Fitzpatrick to Scott Blake Harris and Michele C. Farquhar (March 1, 1996).

¹¹⁴ *Supra* ¶ 23.

¹¹⁵ We will address the issue of international service in this band with respect to U.S. GSO/FSS systems in the individual licenses of GSO/FSS systems.

¹¹⁶ In this regard, we note that France recently submitted information to the ITU of its intention to construct two such NGSO/FSS systems, and Russia also submitted such information for one system.

¹¹⁷ TRW Comments at 36-37.

¹¹⁸ Comments of Teledesic at 22.

opposes this request. In the absence of an international allocation for MSS in the 28.6-29.1 or 18.8-19.3 GHz frequency band, we decline to adopt an inconsistent domestic allocation. We will, however, consider authorizing such uses on a non-interference basis to other services already allocated in this band.

62. GE Americom proposes that the Commission give GSO/FSS operators co-primary status in the 28.6-29.1/18.8-20.3 GHz bands in order to create incentives for NGSO/FSS satellite system operators to resolve interference problems between NGSO and GSO systems.¹¹⁹ Teledesic opposes GE's proposal.¹²⁰ We reject GE Americom's proposal. While GE Americom's proposal would be appropriate if NGSO and GSO services operated under an international regulatory regime that put both types of systems on equal footing in all FSS bands, in fact NGSO/FSS systems operate under a handicap in the majority of FSS frequency bands outside of the 28.7-29.1 GHz band segment, in which RR 2613 applies and which requires any NGSO/FSS system to cease operations if it causes unacceptable interference into a GSO/FSS system.¹²¹ Under these circumstances, access by GSO/FSS systems to the 28.6-29.1 GHz bands without reciprocal access by NGSO/FSS systems to bands designated for GSO/FSS does not provide appropriate incentives for resolution of interference issues. Therefore, NGSO/FSS systems will be the primary satellite system licensees, in the United States, in the 28.6-29.1 GHz band.

E. Inter- and Intra-Service Sharing in the 29.1 - 29.5 GHz Band

1. Sharing in the 29.1-29.25 GHz Band between NGSO/MSS Feeder Link Earth Stations (150 MHz)

63. The sharing principles in the 29.1-29.25 GHz band segment are designed to accommodate the only two licensed NGSO/MSS systems seeking access to this band, the Motorola Iridium system and the TRW Odyssey system, and potential additional NGSO/MSS systems. Although Motorola initially opposed the addition of a second NGSO/MSS system's feeder links in the 29.1-29.3 GHz band,¹²² after extensive technical discussions an agreement was reached whereby TRW's and Motorola's NGSO/MSS systems can operate their respective feeder links in the same assigned spectrum with minimal constraints. In the *Third NPRM* we also proposed that NGSO/MSS feeder links be authorized on a "reverse band working" basis in the 19.4-19.7 GHz band.¹²³ Although we had indicated that we may need to authorize an

¹¹⁹ Comments of GE Americom at 17.

¹²⁰ Reply Comments of Teledesic at 7.

¹²¹ See *supra* note 28.

¹²² Joint Comments of Motorola Satellite Communications, Inc. & Iridium, Inc. at 9.

¹²³ See note 31.

applicant to operate in this manner if sharing was not possible. no party specifically requested operating in a reverse band working mode.¹²⁴ Therefore, we are not adopting any specific criteria at this time for reverse band working and will examine any requests for such operations on a case-by-case basis in the future. Further, Motorola will be limited to operating its feeder links within this 150 MHz band, since Motorola indicates it will be unable to share with GSO/FSS systems in the adjoining band. The following text summarizes the sharing principles to which TRW and Motorola have agreed and which, we conclude, facilitate an equitable sharing environment in the band. The specific sharing rules we adopt are set forth in Appendix B of this *Report and Order*.

64. The parties agreed that in order to facilitate an appropriate sharing atmosphere, Motorola would operate using right-hand circular polarization and TRW would operate using left-hand circular polarization. Both systems will use power control. The parties also concluded that geographical separation of feeder link earth stations and coordination, when the stations are separated by 800 km or less, is also required. Both operators agreed to cooperate fully in identifying mutually acceptable locations for their feeder link earth stations and coordinating these stations.

65. Motorola and TRW agreed that in the shared band segment, TRW will have a maximum of two operational feeder link earth stations in the United States and Motorola will have a maximum of six operational feeder link earth stations in the United States. Further, in the western United States, Motorola will implement a feeder link earth station in the immediate vicinity of Phoenix, AZ and TRW will have a feeder link earth station in the immediate vicinity of San Luis Obispo, CA. In the eastern United States, Motorola will have a feeder link earth station in the immediate vicinity of Montpelier, VT. The location of an additional Iridium feeder link earth station in the eastern United States, will not be specified until an Odyssey feeder link earth station site in the eastern United States, separated from the Iridium Montpelier site by a mutually acceptable distance, is chosen. Accordingly, any additional Iridium feeder link earth stations shall be separated from the Odyssey sites by a mutually acceptable distance. The parties will determine this mutually acceptable distance during the coordination process.

66. Although both parties indicate that use of this band should be exclusive for these two NGSO/MSS systems, at this time we do not believe feeder links from a third NGSO/MSS system should be precluded from operating in the band. However, any NGSO/MSS system requesting use of this band for NGSO/MSS feeder link earth stations will be required to coordinate its proposed site and frequency usage with existing licensees as well as with previously filed applicants in the band prior to filing an earth station application.

¹²⁴ In fact TRW notes that substantial costs and system delays would be involved in order for TRW to operate reverse band. Comments of TRW at 4. Moreover, TRW asserts Hughes's suggestion of requiring one of the two MSS systems to operate uplinks in the 19 GHz band on a reverse band basis, is unacceptable. Reply Comments of TRW at 22.

2. Sharing in the 29.1-29.25 GHz band between NGSO/MSS feeder link earth stations and LMDS (150 MHz)

67. In the *Third NPRM* we proposed sharing rules between LMDS hub-to-subscriber transmissions and NGSO/MSS feeder links in the 29.1-29.25 GHz band. These rules were based on rules agreed to at the NRMC. We proposed to limit NGSO/MSS feeder uplinks in this 150 MHz to eight "feeder link earth station complexes," and identified a number of geographical and procedural restrictions. These rules also anticipated that only one NGSO/MSS system, Motorola, would operate feeder links in this band segment.

68. TRW and Motorola both commented on these rules. TRW believes that the accommodation of a second NGSO/MSS system provides a need for slight revisions to our proposed rules.¹²⁵ In its comments, Motorola claims that these rules originally intended that only one NGSO/MSS operator would use feeder links in this 150 MHz. It states that if sharing were feasible, it still needs the flexibility of choosing eight locations as earth station complexes before the licensing of LMDS service providers and suggests the Commission allow two additional sites.¹²⁶

69. We adopt the rules proposed in the *Third NPRM* with some modifications as a result of the comments. Specifically, we add two additional sites for feeder link earth station complexes because it appears that at least two NGSO/MSS systems will operate in this band segment and will require the flexibility of additional sites. We believe that this addition should not entail any excessive burden on LMDS parties. The following text summarizes these sharing rules. The specific rules are set forth in Appendix B of this *Report and Order*.

70. Under the sharing rules adopted today, NGSO/MSS licensees can operate feeder link earth stations in up to ten designated metropolitan statistical areas (MSAs) without further coordination. We require the feeder link earth station complexes to be identified no more than 15 days after the release of a public notice announcing the commencement of LMDS auctions. LMDS receive stations must accept any interference caused to them by these MSS feeder link earth stations, within the specified MSA, and up to 75 nautical miles from the earth station geographical coordinates. If these sites are not identified within this 15 days, then they will have to coordinate. These sites must be chosen in accordance with the following requirements: no feeder link earth station complex may be located in the top eight (8) MSAs, ranked by population, as defined by the Office of Management and Budget as of June 1993, using estimated populations as of December 1992; two (2) complexes may be located in MSAs 9 - 25, one of which must be Phoenix; two (2) complexes may be located in MSAs 26-50; three (3) complexes may be located in MSAs 51-100, one of which must be Honolulu, Hawaii; and the three (3) remaining complexes must be located at least 75 nautical

¹²⁵ See Comments of TRW at 20. TRW also suggests modifications to our proposed rules. See Attachment 2 of TRW Comments.

¹²⁶ Joint Reply Comments of Motorola and Iridium at 13.

miles from the borders of the 100 largest MSAs or in any MSA not included in the 100 largest MSAs. Any location allotted for one range of MSAs may be taken from an MSA below that range.

71. We adopt a prohibition on transmission of LMDS subscriber transceivers in this shared 150 MHz band segment. As previously discussed, the LMDS and NGSO/MSS interested parties were unable to reach a consensus on sharing criteria for MSS feeder links and LMDS subscriber-to-hub transmissions, *supra* ¶ 37. At this time we find it necessary to restrict LMDS use of this band segment to hub-to-subscriber transmissions. However, as indicated earlier, should the LMDS proponents in the future be able to demonstrate definitively that they can technically operate subscriber-to-hub links on a non-interference basis to the NGSO/MSS feeder links, particularly the satellite constellation, we would revisit the restriction we adopt today.

3. Sharing between NGSO/MSS feeder link earth stations and GSO/FSS systems in the 29.25 - 29.5 GHz Band (250 MHz)

72. The proposal in the *Third NPRM* designated co-primary usage of 250 MHz for NGSO/MSS feeder links and GSO/FSS systems.¹²⁷ We stated that any coordination between the GSO/FSS systems and the NGSO/MSS feeder link earth stations would be "on a first-come-first served" basis.¹²⁸ Since the adoption of the *Third NPRM*, TRW and Hughes have negotiated mutually acceptable sharing principles. Although these sharing principles were worked out between TRW and Hughes, other GSO/FSS applicants, GE Americom, AT&T and Lockheed Martin, support the principles. Therefore, we conclude that the "first-come-first served" coordination proposal is no longer necessary. Instead, we endorse the spectrum sharing principles developed by TRW and Hughes and supported by other GSO/FSS applicants, for their systems in the 29.25-29.5 GHz band.¹²⁹ In the following text, we describe these principles. The specific technical sharing rules we adopt are provided in Appendix B of this *Report and Order*.

73. Specifically, TRW and Hughes agreed that the system causing unacceptable interference has primary responsibility to mitigate the interference, but that neither system

¹²⁷ See *Third NPRM* at ¶ 64.

¹²⁸ *Id.* Many GSO/FSS proponents commented on this issue and urged the Commission to eliminate the proposed first-come-first-served rule because MSS systems will likely be deployed before GSO/FSS systems and would have the advantage in coordinating. See Comments of GE Americom at 4; Comments of Hughes at 17 and Reply Comments of Orion at 6-7. But see Joint Comments of Motorola and Iridium Inc. at 14.

¹²⁹ See *ex parte* submission filed by the International Bureau to William F. Caton, (Feb. 6, 1996): *Co-Directional Frequency Sharing Between Odyssey Feeder Links and GSO/FSS Service Links in 29.25-29.5 GHz and 19.45-19.7 GHz Bands* p. 7 (dated Feb. 5, 1996).

would be required to disrupt or alter its transmissions.¹³⁰ Moreover, TRW will provide the locations of its two feeder link earth stations in the United States.¹³¹ All GSO/FSS proponents will implement frequency and polarization selection techniques in the area of TRW's earth station complexes in order to minimize instances of unacceptable interference.

74. Furthermore, use of the band 29.25 - 29.5 GHz by another NGSO/MSS system for feeder link earth station uplinks will be subject to coordination agreements with existing GSO/FSS parties.

F. Downlink 17.7-20.2 GHz Frequency Band Segmentation

75. In the *Third NPRM*, we asked commenters to address issues concerning satellite system use of the 17.7-20.2 GHz band. Specifically, we sought comment on possible methods of accommodating NGSO/MSS feeder links operating on a reverse band working basis in the 19.4-19.7 GHz band. We also sought comment on the related issue of whether, in order to facilitate reverse band working, GSO/FSS downlinks should be designated on a non-conventional paired basis at 18.3-18.55 GHz or on a conventional basis at 19.3-19.425 GHz and 19.575-19.7 GHz for pairing with the 29.25-29.5 GHz uplink band.¹³² We also sought comment on any other issues concerning downlinks that might affect the band segmentation plan.

76. Several parties commented on this issue. TRW urges the Commission to designate the 18.3-18.55 GHz band as the paired downlink for the 29.25-29.5 GHz GSO/FSS uplink band, regardless of whether reverse band working is used at 19.4-19.7 GHz.¹³³ It argues that doing so would facilitate deployment of NGSO/MSS feeder links. Motorola also supports providing GSO/FSS applicants flexibility regarding selection of downlink frequencies below 19.2 GHz to be paired with uplinks at frequencies below 29.5 GHz.¹³⁴ Hughes suggests that GSO/FSS systems should be allowed to use frequencies not only in the 18.3-18.55 GHz band for downlinks, but also in the 17.7-18.3 GHz band. It notes that, particularly in the 19.45-19.7 GHz band, NGSO/MSS feeder links are likely to impose significant constraints, such as exclusion and coordination zones, on GSO/FSS operations. It suggests

¹³⁰ *Id.* at 7.

¹³¹ TRW has identified one location in the San Luis Obispo area. The other location will be on the east coast in a low population density area.

¹³² Under "conventional" uplink and downlink pairing, part of the 28 GHz band would be separated by 9.8 GHz from the uplink band. Under "non-conventional" pairing, this frequency separation may vary according to the designation of spectrum for GSO/FSS systems in different parts of the band.

¹³³ Comments of TRW at 29.

¹³⁴ Joint Comments of Motorola and Iridium at 16-17.

that, in order to solve this problem, applicants should be provided the additional flexibility that operations in these other frequency bands will allow. Teledesic, on the other hand, opposes designating any frequencies below 18.55 GHz for GSO/FSS uses.¹³⁵ It argues that doing so would reduce the frequencies available for pairing with its gateways and high data rate (gigalink) terminal uplinks in the 27.5-28.35 GHz bands. In response, TRW argues that Teledesic's request for sole use of frequencies in the 17.7-18.55 GHz range is unjustified.¹³⁶ Hughes notes that the uses for which Teledesic seeks protection are secondary uses. Several commenters also observed that, in the 18.6-18.8 GHz band, power limitations imposed by the ITU Radio Regulations and U.S. domestic allocations to support Space Research and Earth Exploration Satellite Service may render the band difficult to use for GSO/FSS systems, and thus flexibility is required in the pairing of uplink and downlink frequencies.

77. The 17.7-20.2 GHz band segmentation plan can be depicted as follows:

Downlink Band 17.7 - 20.2 GHz

GSO/FSS FIXED ngso/fss 1100 MHz	NGSO/FSS FIXED gso/fss 500 MHz	MSS F.L. FIXED gso/fss 400 MHz	GSO/FSS ngso/fss 500 MHz
17.7	18.80	19.30	19.70 20.20 GHz

This plan specifically designates downlinks in the 17.7-18.8 GHz band for GSO/FSS uses, the 18.8-19.3 GHz band for NGSO/FSS uses, the 19.3-19.7 GHz band for NGSO/MSS feeder links, and the 19.7-20.2 GHz band for GSO/FSS uses. These designations do not preclude the authorized use of these bands by other satellite applications on a secondary basis to the primary satellite application designated in the band.

78. With respect to GSO/FSS uses, we have designated the 19.7-20.20 GHz GSO/FSS band segment for a "conventional" downlink pairing with GSO/FSS uplinks at 29.5-30.0 GHz. In order to provide flexibility for GSO/FSS applicants, we are also designating the 17.7-18.8 GHz band for GSO/FSS uses. Although there are several restrictions on the use of this band, including the need to protect feeder links for the Broadcast Satellite Service in the 17.7-17.8 GHz band segment, power flux density limits to protect the Earth Exploration

¹³⁵ Comments of Teledesic at 7.

¹³⁶ TRW Reply Comments 22-24.

Satellite Service in the 18.6-18.8 GHz band, and the need to coordinate with Fixed Services in the 17.7-19.7 GHz band, we conclude that the flexibility afforded by 1.1 GHz of spectrum should provide sufficient downlink capacity to correspond with the 1000 MHz of uplink spectrum designated for GSO/FSS in the 27.5-30.0 GHz range.¹³⁷ We decline to limit GSO/FSS use of the bands below 18.55 GHz as requested by Teledesic. The use of these bands by GSO/FSS should not preclude their use by Teledesic on the secondary basis vis-a-vis GSO/FSS which Teledesic has proposed.

79. With respect to the NGSO/FSS uses, we designate the 18.8-19.3 GHz band segment for paired downlinks with the 500 MHz of NGSO/FSS uplinks at 28.6-29.1 GHz. As discussed *supra*, we conclude that an unconditional designation of 500 MHz for domestic NGSO/FSS use is warranted. Furthermore, while there will be constraints imposed on NGSO/FSS subscriber terminals by fixed services in the 18.8-19.3 GHz band, there is no indication on the record that the single NGSO/FSS system proposed lacks sufficient flexibility to provide downlink capacity to correspond with the designated 500 MHz of uplink spectrum.¹³⁸ Therefore, we are not designating any additional downlink spectrum for primary NGSO/FSS uses.

80. We designate the 19.3-19.7 GHz band segment for downlink NGSO/MSS feeder links. This band should be able to accommodate the systems proposed by two current licensees and could potentially accommodate additional systems, either for downlinks, or, if the system operates on a reverse band working basis, for uplinks.¹³⁹ The record establishes that sharing between all currently proposed GSO/FSS systems and NGSO/MSS feeder links is generally not feasible without imposing unacceptable constraints on the deployment of several of the proposed systems.

1. Coordination Procedures

81. GSO/FSS, NGSO/MSS feeder links and NGSO/FSS systems are all fixed satellite services. Under current rules, such services share the 17.7-19.7 GHz band with fixed services on a coequal basis.¹⁴⁰ Current rules require coordination of these services pursuant to

¹³⁷ Our downlink proposal is also supported by several of the satellite applicants. See *ex parte* letter from Edward J. Fitzpatrick, (Vice President of Hughes Communications Galaxy, Inc.), Waring Partridge, (Vice President, AT&T), Philip V. Otero, (Vice President and General Counsel, GE American Communications, Inc.), and Michael D. Kennedy, (Vice President and Director Regulatory Relations), Motorola, Inc. to William F. Caton (June 5, 1996).

¹³⁸ For example the Digital Electronic Messaging Service ("DEMS") is licensed in the 18.82-18.92 GHz band.

¹³⁹ The ability to accommodate additional systems may depend on a number of factors, including bandwidth required, system orbit geometry, operation in reverse band mode, and the outcome of the WRC-97's deliberations concerning the 29.4-29.5 GHz and 19.6-19.7 GHz bands. See RES-120 (WRC-95).

¹⁴⁰ See 47 C.F.R. 25.202 (a)(1).

the requirements in Section 25.130(b) of the rules, and under the procedures outlined in Section 101.103 of the Rules. These coordination rules will continue to be applied in these bands; however, should the affected parties wish to propose slightly modified procedures to facilitate the deployment of these services, we would consider such a proposal in the future. The record does not indicate that other requirements for coordination between non-government satellite systems are necessary at this time.¹⁴¹

G. Allocation at 29.5-30.0 GHz

82. As we mentioned in the *Third NPRM*, the 29.5-30.0 GHz frequency band is allocated on a co-primary basis to both the MSS and FSS. Currently there are no MSS systems in the band.¹⁴² Because we tentatively concluded that MSS and FSS systems cannot share the same frequencies, and our proposed band plan designated GSO/FSS systems in this 500 MHz of the band, we requested comment on whether to eliminate the allocation for MSS at 29.5-30.0 GHz or possibly modify the MSS allocation as a secondary allocation to FSS systems at 29.5-30.0 GHz.¹⁴³

83. Teledesic opposes any decision to eliminate, or relegate to secondary status, the MSS allocation at 29.5-30.0 GHz, asserting that such a reallocation would conflict with the 1992 WARC decision allocating the 29.9-30.0 GHz band for GSO MSS/FSS uses.¹⁴⁴ Teledesic also expressed concern that this is the only portion of the Ka-band presently available for MSS use and any change in the existing MSS allocation would adversely affect NGSO satellite system applicants proposing MSS use in the 28 GHz band.¹⁴⁵

84. Initially, Hughes supported either deletion in the U.S. allocation table of MSS at 29.5-30.0 GHz or a modification of this allocation to define it as secondary.¹⁴⁶ Hughes argued that absent interference mitigation techniques, "it is unlikely that MSS service links and FSS systems can share that 500 MHz due to the ubiquitous nature of both MSS and FSS

¹⁴¹ With respect to government systems, parties should take note of footnote US 334 of the Table of Frequency Allocations. See 47 C.F.R. § 2.106.

¹⁴² Norris Satellite Communications, which was licensed to provide FSS services in this band in 1992, initiated the proceeding for the MSS allocation in the 29.5-30.0 GHz band.

¹⁴³ See *Third NPRM* at ¶ 67.

¹⁴⁴ See Comments of Teledesic at 10.

¹⁴⁵ *Id.* Teledesic's argument that any action taken by the Commission to remove or modify the MSS allocation at 29.5-30.0 GHz may have an adverse effect on the U.S. at WRC-95 is now moot.

¹⁴⁶ Hughes Comments at 28.

receive and transmit equipment."¹⁴⁷ However, in its reply comments, Hughes "refined" its initial recommendations and now asserts that it may be possible for MSS and FSS to coexist in the future if appropriate sharing criteria are adopted.¹⁴⁸ Thus, rather than change the current MSS allocation in the 29.5-30.0 GHz band, Hughes believes the Commission should decline to license any MSS use of the band unless and until MSS use is made compatible with FSS use through the development of appropriate sharing criteria.¹⁴⁹ Motorola in contrast, supports the elimination of the MSS allocation in the 29.5-30.0 GHz band. It asserts that there are significant difficulties for FSS and MSS sharing in this segment of the band.¹⁵⁰ Motorola believes the removal of the MSS allocation would provide assurance to GSO/FSS proponents that service can be developed without the need for ever coordinating with an MSS system.¹⁵¹

85. We believe that the development of technology may enable these two different types of systems to co-exist in the same frequencies in the future. Therefore, we believe that maintaining the co-primary MSS/FSS allocation is in the public interest. This will facilitate the development and introduction of such technology. We explicitly decline to license any MSS system at 29.5-30.0 GHz, and the downlink 19.7-20.2 GHz band, however, until the applicant proposing an MSS service establishes that it can co-exist and share the frequency band with GSO/FSS systems. MSS applicants must demonstrate in their applications that their service is compatible with and will not cause harmful interference to GSO/FSS systems. MSS service rules will be appropriately addressed at the time that such an MSS application is received.

H. Point-to-Point Microwave

86. We noted in the *Third NPRM* that Harris Corporation-Farion Division (Harris) and Digital Microwave Corporation (Digital) filed a Petition for Rulemaking,¹⁵² requesting that the Commission channelize the 28 GHz band for point-to-point microwave radio station

¹⁴⁷ *Id.* Hughes argued that under the current plan, introduction of one incompatible MSS system at 29.5-30.0 GHz could reduce by 50% the amount of 28 GHz spectrum available for GSO/FSS service.

¹⁴⁸ Hughes has not proposed any sharing criteria at this time.

¹⁴⁹ Reply Comments of Hughes at 18.

¹⁵⁰ Recommendation 719 urged that the sharing between FSS and MSS in these bands be examined as a matter of urgency. This examination was conducted by ITU Working party 4A in the ITU-R Study Group 4 in accordance with Question ITU-R 81-4, and resulted in a Preliminary Draft New Recommendation, which illustrates the significant difficulties posed by FSS and MSS sharing in the 29.5-30.0 GHz band. See Joint Comments of Motorola Inc., and Iridium, Inc. at 18-19.

¹⁵¹ Joint Reply Comments of Motorola Satellite Communications, Inc. and Iridium, Inc. at 19.

¹⁵² Amendment of Parts 2, 21, and 94 of the Commission's Rules Concerning Channel Assignments in the 27.5 - 29.5 Ghz Band. Petition for Rulemaking, RM-7722.

use, and make the band available under Part 94 of our rules for private operational fixed services. In the disposition of a similar petition filed by the companies in the initial *NPRM* in this Rulemaking Proceeding¹⁵³ we declined to dedicate any part of the 28 GHz band solely to fixed point-to-point microwave (FS) services. We expressed the view that the public interest would be better served by providing terrestrial licensees in the 28 GHz band with the flexibility to offer a variety of services and to develop innovative new point-to-multipoint services. In the *Third NPRM*, we also said that parties interested in providing point-to-point services may apply for LMDS spectrum, seek geographic partitioning or spectrum disaggregation opportunities, or lease spectrum from LMDS operators.¹⁵⁴

87. TIA takes exception to the Commission's characterization of the record in the *Third NPRM*, citing the history of support in this docket for FS services.¹⁵⁵ TIA notes that Harris' channelization request was not for exclusive allocation of the 28-GHz band to FS services, or a restriction on the co-primary rights of satellite users in the band. TIA also alleges that the Commission has based its decision to remove point-to-point FS service from the 28 GHz band allocation substantially on the ground that this band has not been used and no point-to-point demand has been shown. But, according to TIA, Harris and Digital have each made showings that demand exists. Moreover, it notes that "the spectrum available for short-haul microwave services has steadily diminished over the past four years just as the critical need for such services has climbed."¹⁵⁶

88. According to TIA, our proposal for FS service in the 28 GHz band will not work. First, it contends, the proposal will not work because there are no service rules for FS services and because applications for intermediate microwave links are not subject to auction.¹⁵⁷ Second, it claims that for LMDS and point-to-point microwave to coexist, the Commission must redefine the spectrum allocation to specify part of the spectrum for LMDS backbone links (spectrum used to interconnect cells), which TIA believes could be shared with traditional point-to-point uses.¹⁵⁸

89. TIA also argues that our suggestion that geographic partitioning or spectrum

¹⁵³ In the Matter of Rulemaking to Amend Part 1 and Part 21 of the Commission's Rules to Redesignate the 27.5-29.5 GHz Frequency Band and to Establish Rules and Policies for Local Multipoint Distribution Service, Notice of Proposed Rulemaking, Order, Tentative Decision and Order on Reconsideration, 8 FCC Rcd. 557 (1993).

¹⁵⁴ *Third NPRM*, ¶¶ 51-53.

¹⁵⁵ TIA Comments at 4-11.

¹⁵⁶ *Id.* at i.

¹⁵⁷ *Id.* at 12-13.

¹⁵⁸ *Id.* at 12-14.

disaggregation would work for point-to-point uses is flawed because LMDS providers are free to hoard unused frequencies, or to charge exorbitant rates for the use of such frequencies. Besides, TIA claims, there is no evidence that LMDS's point-to-multipoint feature and point-to-point services are compatible.¹⁵⁹

90. To resolve this dilemma, TIA recommends that the Commission dedicate 500 MHz of the 28 GHz band (28.35 -28.6 GHz and 29.25 - 29.5 GHz) to FS services on a shared, co-primary basis with FSS and MSS services and 300 MHz (28.2 - 28.35 GHz and 29.1 - 29.25 GHz) on a shared, co-primary basis with LMDS backbone links.¹⁶⁰ The second part of this proposal would require us to designate a portion of the proposed LMDS assignment to backbone usages.

91. Hughes and CTA urge the Commission to dismiss the claim of FS service proponents that the Commission has failed to address their spectrum needs. Hughes notes that the Commission has preliminarily determined that the spectrum needs of FS licensees can be satisfied in other bands.¹⁶¹

92. Hughes strongly opposes allowing FS services to operate on a co-primary basis in that portion of the band now designated for FSS. Hughes contends that the proposed band plan requires it to share spectrum with MSS feeder links, and to lose access to 1.5 GHz of previously available spectrum to assist in resolving terrestrial coordination problems.¹⁶² If FSS operators are required to also coordinate with terrestrial services, use of the FSS 1 GHz of remaining spectrum would be further constrained.¹⁶³ CTA also notes FS operations are incompatible with those proposed for LMDS, FSS, and MSS feeder links in the 28 GHz band.¹⁶⁴ The introduction of another incompatible assignment at this time would only serve to further delay the resolution of the band plan and delay or preclude the implementation of many of the proposed advanced services.¹⁶⁵ Similarly, CellularVision argues that the TIA proposal is inconsistent with the needs of LMDS operators. In its view, LMDS licensees should have the discretion to use any portion of their spectrum for backbone links, because such decisions will depend on the technology deployed, the number of LMDS operators per service area, the location of MSS feeder link stations, and a number of other factors. CTA

¹⁵⁹ *Id.* at 13-14.

¹⁶⁰ *Id.* at 14-18.

¹⁶¹ *Id.* at 21; *see also* CellularVision Reply Comments at 12-13.

¹⁶² *Id.* at 23; *see also* Loral Reply Comments at 2-3.

¹⁶³ Hughes Reply Comments at 23.

¹⁶⁴ *See also* Motorola Satellite Communications, Inc. and Iridium, Inc. Joint Reply Comments at 19-21.

¹⁶⁵ CTA Reply Comments at 6.

contends that there is sufficient alternate spectrum available for FS operations, particularly in the 39 GHz band.

93. We decline to designate any portion of the 28 GHz band as primary for point-to-point microwave use. As we have noted, the proponents for fixed microwave services (FS) have not provided persuasive information to support such action. The claim that there is insufficient point-to-point microwave spectrum allocated for FS lacks merit. We acknowledge that the potential number of users for the 4, 6, and 11 GHz bands has increased as a result of other Commission actions and that numerous requests are filed in the 6 and 11 GHz bands. However, the fact that all new FS applications filed in these bands have been granted, suggests that there is ample spectrum available to meet FS service demands.¹⁶⁶ Moreover, for short haul routes, there are assignments available in the 18, 23, and 39 GHz bands. These bands represent almost 8 GHz of spectrum for FS. In addition, in ET Docket No. 92-9,¹⁶⁷ the Commission redesignated the 10 GHz band for point-to-point microwave use, and in ET Docket No. 95-183,¹⁶⁸ the Commission proposed to provide another 1.6 GHz of FS spectrum in the 37.0-38.6 GHz band. We also note that there is a trend among major long haul carriers to rely less on point-to-point microwave facilities to render their services, suggesting that more spectrum will become available in the 4, 6, and 11 GHz bands, particularly in metropolitan areas. Given the capability of FS networks to make effective and efficient reuse of spectrum, we conclude, based on the current record, that sufficient spectrum is available to meet FS requirements for the foreseeable future.

94. We have noted in this proceeding that the 28 GHz band had been fallow for a significant period of time. TIA argues that the FS industry failed to use the spectrum because of the lack of a frequency channelization plan. This argument is not persuasive given the history of developments in other FS bands, which the point-to-point microwave industry performed extremely well for years without codified channel plans.¹⁶⁹ We further note that, although no formal 28 GHz channel plan exists, FS operators were not precluded from applying for channel assignments, and manufacturers were not precluded from developing and marketing such equipment. For these reasons, we believe TIA's argument lacks merit.

¹⁶⁶ For example, over the past four years in the Common Carrier FS Service, we have received an average of 5,740 applications per year. Of these, more than 38 percent include requests for new frequencies, all of which we have granted.

¹⁶⁷ *Redevelopment of Spectrum to Encourage Innovation in the Use of New Telecommunications Technologies, Second Report and Order* in ET Docket No. 92-9, 8 FCC Rcd 6495, 6499-6511 (1993).

¹⁶⁸ *In the Matter of Amendment of the Commission's Rules Regarding the 37.0-38.6 GHz and 38.6-40.0 GHz Bands and Implementation of Section 309(j) of the Communications Act -- Competitive Bidding, 37.0-38.6 GHz and 38.6-40.0 GHz, Notice of Proposed Rulemaking and Order*, ET Docket No. 95-183 and PP Docket No. 93-253, FCC 95-500. Released December 15, 1995.

¹⁶⁹ The Commission did not codify channelization plans for the 4, 6, and 11 GHz bands until August 13, 1993. See *Second Report and Order* in ET Docket No. 92-9 at 6535-6555.

IV. FOURTH NOTICE OF PROPOSED RULEMAKING

A. Proposal to designate the 31.0-31.3 GHz band for LMDS

1. Introduction

95. By this action, we propose to designate, on a primary protected basis, the 31.0-31.3 GHz (31 GHz) band to LMDS.¹⁷⁰ We propose to designate this band for both hub-to-subscriber and subscriber-to-hub transmissions. This action stems from efforts to accommodate a variety of LMDS system designs, services and transmission media in the adjacent 28 GHz band,¹⁷¹ and is being taken on our own motion.¹⁷² This proposed designation of spectrum for LMDS would provide consumers access to more choices in service providers, new services, and innovative technologies, while accommodating those LMDS system designs requiring a wide separation between the transmit and receive frequencies when operated in a two-way mode.

2. Background

96. Currently, the 31 GHz band is allocated on a primary basis to non-Government fixed and mobile services and on a secondary basis to both the Government and non-Government standard frequency and time signal satellite downlink operations. Our current rules pertaining to this band do not provide interference protection to any operations in this band.

97. In the attached *Report and Order*, we adopt a frequency band segmentation plan which designates 1000 MHz of spectrum in the 28 GHz frequency band for LMDS. One segment of that, 150 MHz, is to be shared by LMDS on a co-primary basis with NGSO/MSS feeder links in the 29.1-29.25 GHz segment of the band and is limited to LMDS hub-to-

¹⁷⁰ See Sections 21.701(k), 74.602(h), 78.18(a)(5), 94.65(n), and 95.1(b) of our Rules, 47 C.F.R. §§ 21.701(k), 74.602(h), 78.18(a)(5), 94.65(n), & 95.1(b). Our proposal to designate LMDS as a primary "protected" use at 31 GHz means that LMDS service providers will be entitled to interference protection from any other current authorized primary user of this band.

¹⁷¹ In the matters of Rulemaking to Amend Part 1 and Part 21 of the Commission's Rules to Redesignate the 27.5-29.5 GHz Frequency Band and to Establish Rules and Policies for Local Multipoint Distribution Service, 8 F.C.C. Rcd. 557; *Id.*, 9 F.C.C. Rcd. 1391 (1994); Rulemaking to Amend Parts 1, 2, 21, and 25 of the Commission's Rules to Redesignate the 27.5-29.5 GHz Frequency Band, to Reallocate the 29.5-30.0 GHz Frequency Band, to Establish Rules and Policies for Local Multipoint Distribution Service and for Fixed Satellite Services and Suite 12 Group Petition for Pioneer's Preference, CC Docket No. 92-297 and PP-22, 11 F.C.C. Rcd. 53 (1995).

¹⁷² Section 1.1 of the Commission's Rules, 47 C.F.R. § 1.1.

subscriber transmissions.¹⁷³ The other 850 MHz is located in the 27.5-28.35 GHz band, where LMDS is the primary designation with FSS designated secondary licensing priority. The record developed in this proceeding indicates potential LMDS operators contemplate offering two-way services between hubs and subscribers. Our 28 GHz band plan does not permit, at this time, two-way LMDS communications in the 29.1-29.25 GHz band.¹⁷⁴ Thus, without additional unencumbered spectrum, some proposed LMDS systems would not be able to provide the full panoply of two-way services anticipated. In this proceeding, we have recognized the potential value of LMDS in enabling real competition in the local telephony and MVPD markets, and we seek to enable a variety of LMDS technologies to be offered.

98. In the *Third NPRM*, we proposed to designate the 29.1-29.25 GHz band segment for assignment to NGSO/MSS feeder links and LMDS systems on a co-primary basis. In this 150 MHz, we based our proposed sharing criteria on an agreement on frequency sharing reached by Motorola, CellularVision, and Texas Instruments during the LMDS/FSS 28 GHz band Negotiated Rulemaking.¹⁷⁵ As a result, we proposed specific sharing rules for hub-to-subscriber transmission.¹⁷⁶ Although this agreement provided that subscriber transceivers would not be permitted to transmit in this shared band, we did suggest in the *Third NPRM* that it may be possible to permit LMDS subscriber-to-hub transmissions in the 150 MHz of the shared spectrum under certain sharing criteria.¹⁷⁷ After numerous comments, and meetings and discussions with LMDS and NGSO/MSS feeder link proponents, it appears that undesirable sharing constraints would need to be placed on either Motorola's Iridium uplink receivers or LMDS transmitters in order to enable sharing in the subscriber-to-hub direction. Other attempts to accommodate LMDS subscriber-to-hub transmissions have been unsuccessful as well.¹⁷⁸ Nevertheless, we consider it important to accommodate those LMDS proponents who note that a non-contiguous segment of the band would actually be desirable for isolating at least some of the inbound subscriber channels from the outbound channels.¹⁷⁹ Thus, in the attached *Report and Order* we do not permit LMDS subscriber-to-hub transmissions in the 29.1-29.25 GHz band, but indicate we would revisit this limitation should LMDS providers or LMDS equipment manufacturers be able to demonstrate that LMDS can

¹⁷³ See *infra* ¶¶ 67-71.

¹⁷⁴ *Id.*

¹⁷⁵ See Report of the LMDS/FSS 28 GHz band Negotiated Rulemaking Committee, Addenda. See also *Report and Order* at ¶¶ 34.

¹⁷⁶ See *Third NPRM* at Appendix B.

¹⁷⁷ See *Third NPRM* at ¶ 63.

¹⁷⁸ See *Report and Order* at ¶¶ 38-40.

¹⁷⁹ See, e.g., Comments of Endgate Corporation at 1; Comments of Pacific Telesis Wireless Broadband Services at 2.

share. through mutually agreed upon criteria, on a non-interference basis with MSS feeder links in this band segment.¹⁸⁰

99. In a rulemaking proceeding, Gen. Docket No. 82-334,¹⁸¹ we adopted a plan designed to satisfy various types of short range, fixed and mobile communications requirements in the 31 GHz band. For example, a common carrier could utilize this band to establish a temporary radio link to bypass an existing cable facility which had been disrupted. A broadcaster or cablecaster needing to establish a radio link between a television camera and a mobile relay station could find this band equally valuable. According to our databases and *ex parte* comments,¹⁸² existing use of the 31 GHz band is relatively light and is concentrated in only a few areas of the country. The majority of licensees in this band are local governments using the band to monitor and control traffic light facilities. In addition, it appears that a few licensees are using this spectrum for local area networks (LANs).

3. Discussion

100. In order to ensure that there is adequate two-way interactive capacity for the various proposed LMDS systems, we recognize the need to designate additional spectrum for LMDS. There is significant consumer demand for alternate providers of local exchange services, internet access, LANs and video teleconferencing. The LMDS proponents note that this demand can be more immediately satisfied, in an economically and technically efficient manner, by LMDS than by many of the alternate transmission media, thus making these services more accessible rapidly to a wider segment of the population. The proposed designation of 300 MHz of spectrum would ensure consumers access to new and competitive services and technologies. Further, through written *ex parte* comments, several LMDS proponents highlighted some technical difficulties with using the 31 GHz band, *e.g.*, need for two antennas to deliver the desired service, effects on performance level, and increased system costs.¹⁸³ We request that parties address our proposal to make the LMDS service a primary protected use in the 31.0-31.3 GHz band, the technical issues LMDS operators might encounter in using this band, and possible measures that may be used in overcoming such technical issues.

101. While we do not address generally those issues relating to LMDS service rules,

¹⁸⁰ See *Report and Order* at ¶ 71. As indicated in the *Report and Order* at ¶ 39 we also pursued sharing with NASA at 28 GHz.

¹⁸¹ *Establishment of a Spectrum Utilization Policy for the Fixed and Mobile Services' Use of Certain Bands between 947 MHz and 40 GHz, Second Report and Order (Second Report and Order)*, 50 Fed. Reg. 7338 (1985).

¹⁸² See, *e.g.*, Hewlett Packard Letter dated June 18, 1996; Texas Instruments Letter dated June 19, 1996.

¹⁸³ See *e.g.*, CellularVision Letter of March 29, 1996; Hewlett Packard Letter of March 29, 1996; Wiley, Rein & Fielding Letter of April 23, 1996, on behalf of Texas Instruments.

licensing policies, or technical requirements raised in the *Third NPRM*, we seek comment on how to assign this additional spectrum to LMDS entities. Should it be treated as a separate block and assigned independently of other LMDS spectrum? Or should it be combined with spectrum assigned in the attached *Report and Order* for LMDS operations and assigned as a single block? We propose that the 31 GHz spectrum and the 1000 MHz designated in the attached *Report and Order*, be assigned as a single block. We believe it is vital to the LMDS industry to commence the licensing process as soon as possible, and thus intend to resolve all remaining issues on an expedited timeframe.

102. As noted in paragraph 101, there are existing licensees operating in this band, some of which are engaged in traffic signal communications, *i.e.*, traffic light monitoring and control. As stated earlier, existing usage appears to be relatively light and geographically concentrated. Overlaying LMDS operations in those areas where there are such uses raises the potential for interference problems which could degrade the utility of such systems and perhaps adversely affect LMDS operations. We point out, however, that our current rules explicitly provide that authorized operations at 31 GHz are not afforded any rights or obligations with respect to interference with other licensed operations.¹⁸⁴ This means that a licensee choosing to place its operations in this band is not entitled to protection from interference by any other licensee regardless of whether the interfering licensee was authorized prior or subsequent to the licensee receiving interference. Thus, we believe that any operations that an entity believes are critical in nature and should otherwise warrant interference protection should be operated in a frequency band where such necessary protection is provided for in our rules.¹⁸⁵ One band where these types of operations are permitted is the 23 GHz band. However, because systems in the 23 GHz band receive interference protection, new systems are subject to the prior coordination requirements of Section 101.103(d). We ask what effect these requirements will have on 31 GHz systems moving to the 23 GHz band. We also note that mobile operations are permitted in the 31 GHz band but are not permitted in the 23 GHz band. We are not aware of any existing mobile operations in the 31 GHz band but ask what effect, if any, this will have in moving current fixed operations to the 23 GHz band. Given that incumbents are only authorized to operate on a non-interference basis, should they be entitled to any recovery for reasonable relocation costs? If so, should any of the 28 GHz band applicants be required to contribute to the recovery of such reasonable costs?

103. Our proposal to make LMDS a protected service in this band presupposes that incumbent licensees continue to operate on a unprotected basis, in this instance, "secondary" to LMDS. In the event one of the unprotected operations interferes with, or receives interference from, an LMDS system, the unprotected licensees must take steps to remedy the problem, or accept the resulting interference if it is operating the affected receiver or transmitter. Although the incumbent licensees have assumed all the risks of receiving

¹⁸⁴ See n. 170.

¹⁸⁵ *Second Report and Order* at ¶ 10.

interference. given the nature of some of these operations, we seek comment on whether there are any methods by which their operations could be accommodated without delaying, causing interference to, or limiting the usefulness of LMDS services in this band. In light of the proposed "secondary" nature of the non-LMDS fixed services in this band, we believe it is also appropriate to seek comment on whether we should accept any new applications, modifications, or renewal applications in the 31 GHz band.

104. Consistent with our intent to allow the rapid deployment of LMDS, we encourage cooperation among the LMDS providers and existing licensees in exploring any methods which would allow the services to coexist, but that would not impose any economic or technical burdens on the LMDS providers. For example, would the LMDS licensees have sufficient capacity to accommodate the existing licensees as customers of their services? Or are there existing mechanisms that will permit all of these services to share the entire band without imposing any economic burdens on LMDS? Or are there other options we should consider? In commenting on this request, we ask that any recommendation advocating sharing include the supporting technical analysis.

B. LMDS Eligibility

1. Introduction; Executive Summary

105. We also seek comment on eligibility of LECs and cable operators to obtain LMDS licenses in the geographic areas they serve. Throughout this proceeding we have examined the relationship between ownership and control of LMDS licenses and competition in the local exchange and multichannel video programming markets. Commenters have had opportunities to address whether open eligibility for LMDS licenses would be likely to impede or hasten competition.¹⁸⁶ The current record of this proceeding, however, was developed prior to enactment of the Telecommunications Act of 1996 (1996 Act). One of the key objectives of the 1996 Act is to expedite the introduction of competition to incumbent LECs and cable companies. In carrying out this statutory mandate, we consider it important to obtain specific comment on how our policies towards LMDS eligibility would best promote the competitive objectives of the 1996 Act. In addition, the number of *ex parte* comments received on this issue after the close of the comment period convince us that further comment is warranted.

106. We continue to view LMDS as an important potential source of competition in both the local exchange and multichannel video programming markets. Unlike the Direct Broadcast Satellite Service, where our rules seek to ensure that there will be independent providers at each of the three orbital locations that serve the continental United States, our proposed rules contemplate only a single LMDS licensee in each service area. Accordingly, in the same market, there will be no competition among multiple LMDS licensees, although some competition may develop among providers of similar services via alternative

¹⁸⁶ See, e.g., *Third Notice*, 11 FCC Rcd 53 (1995).

transmission technologies. It therefore is appropriate to consider measures to ensure that the unprecedented amount of spectrum assigned to each LMDS license will be used to enhance the competitive provision of services in these highly concentrated markets. In this regard we seek comment on whether we should temporarily restrict eligibility for incumbent LECs and cable companies that seek to obtain LMDS licenses in their geographic service areas.

2. Background

a. Notice

107. In the Notice of Proposed Rulemaking that initiated this proceeding, we proposed to license two equal competitors in every LMDS service area and not to restrict the ability of specific types of telecommunications providers to obtain LMDS licenses.¹⁸⁷ In the *Third NPRM*, we proposed only a single LMDS license for each service area and sought additional comment on the eligibility issue.¹⁸⁸ We requested comment on whether Commercial Mobile Radio Service (CMRS) providers and MMDS licensees should be eligible to acquire LMDS licenses. We also sought comment on LEC and cable participation in LMDS.¹⁸⁹

108. With respect to the eligibility of LECs to obtain the single LMDS license in their service area, we tentatively concluded that the Communications Act did not prohibit a LEC from acquiring an LMDS license.¹⁹⁰ We sought comment, however, on whether allowing a LEC to acquire the LMDS license in its service area would eliminate an important source of new competition in the local exchange market. We also asked whether the LECs would be likely to acquire LMDS spectrum as a means of forestalling competitive entry into the local exchange market by warehousing spectrum or diverting it to less competitive uses. We also sought comment on competitive issues raised by LEC plans to offer video services to the telephone subscribers of their wired plant. As an alternative approach to eligibility restrictions, we asked whether our proposed build-out requirements would mitigate these competitive concerns, and what other actions we might take to address them.

109. In analyzing the possible competitive impact of cable television ownership of LMDS within its cable franchise area, we tentatively concluded that there are no statutory or regulatory restrictions that prohibit a cable operator from holding an interest in an LMDS licensee.¹⁹¹ We asked for comment on whether cable operators acquiring LMDS within their

¹⁸⁷ *First Notice*, 8 FCC Rcd 557 (1993).

¹⁸⁸ *Third NPRM* at ¶¶ 97-108.

¹⁸⁹ *Third NPRM* at ¶¶ 103-106.

¹⁹⁰ *Third NPRM* at ¶ 104.

¹⁹¹ *Id.*

cable franchise area would have the incentive and ability to inhibit the full deployment of LMDS facilities that compete with their wired cable facilities, for example, by warehousing spectrum or diverting it to less optimal uses. Conversely, we also asked for comment on whether LMDS spectrum might enable cable companies to provide a new competitive source of local exchange service.

b. Comments

110. Comments regarding eligibility center on the competitive implications of telephone companies or cable television companies obtaining the LMDS license in their current service areas. Most parties addressing this issue support unrestricted eligibility for LECs and cable operators. Two parties, however, argue for eligibility restrictions barring LEC and cable participation in areas of current operations, and some parties take intermediate positions. No party argues that there are existing legal restrictions on a LEC or cable operator acquiring a LMDS license in their service area.

111. Most commenting parties, particularly the incumbent LECs, argue that there is no policy-based reason to restrict LECs from holding the LMDS licenses in their service area and that LEC participation is in the public interest.¹⁹² All but one commenter agree with our tentative finding that no existing statutory or regulatory restrictions prohibit a cable company from acquiring an interest in an LMDS license in its existing service area.¹⁹³ Both the Joint Parties and NCTA, for example, note that Congress could have, but did not, create a cable-LMDS ban when it passed the 1992 cable-MMDS cross-ownership ban. GTE, however, believes that Section 613(a) of the Communications Act does apply to LMDS licenses.¹⁹⁴

112. BellSouth argues, for example, that given the combinations of services that may be provided using LMDS, and the Commission's stated intent to foster diversity of services and technology in the provision of LMDS, no class of potential providers should be excluded from eligibility. NYNEX argues that the ability to use this spectrum to provide video, telephony, and other services favors competition from all prospective providers. The parties supporting unrestricted eligibility also argue generally that restrictions would stifle competition, prevent competitors from using an efficient mix of technologies and discourage investment by the very entities best equipped to become viable competitors through the use of

¹⁹² Ameritech Comments at 3; Bell Atlantic Comments at 6; BellSouth Comments at 9-10; GTE Comments at 8-9; NYNEX Comments at 2; PTWBS Comments at 2; TI Comments at 18. Note, however, that GTE's opposition to restricting the eligibility of telephone companies in their current markets is based on its recommendation that there be two LMDS licenses in each region. Given the presumption of two licenses, GTE argues that it will not be anticompetitive for the LEC to hold one of them. Competitive pressure would be provided by the other LMDS licensee.

¹⁹³ Ameritech Comments at 2-3; Cox Enterprises, Inc., Comcast Corporation, and Jones Intercable, Inc. (collectively the "Joint Parties") Comments at 3-4; NCTA Comments at 3-4; TI Comments at 17-18.

¹⁹⁴ GTE Comments at 9.

LMDS spectrum. In addition, they claim that opposition to eligibility restrictions is supported by Congress' decision in the Cable Act not to impose a cable-DBS cross-ownership restriction; that because the LMDS licenses will be auctioned, there will be no incentive for license winners to warehouse the spectrum; and, that most LEC service areas are smaller than the license areas being considered here, so that LECs could legitimately use LMDS to extend their current service.

113. As is the case for LEC eligibility, most commenting parties also argue that there is no policy reason to restrict cable operator participation in LMDS auctions, and that such participation is in the public interest.¹⁹⁵ Many parties make the same arguments for cable eligibility that they made for LEC eligibility. In addition, the Joint Parties and NCTA argue that the considerations which led Congress to the cable-MMDS ban are not present today because the increase in competition faced by cable operators since the 1992 ban was enacted has entirely changed the market faced by cable operators. These parties conclude that cable firms have no market power, and thus no incentive to attempt to quash LMDS as a market alternative. These parties further assert that upon a comparison of the average BTA and the average cable franchise, cable operators will have *de minimis* overlap, and *de minimis* market power for any one service throughout a BTA. They argue that the prospect of a cable-LMDS combination does not raise the concerns present with cellular-PCS cross ownership. They contend that the Commission decided not to preclude LECs from owning and operating PCS facilities in their service area, despite the fact that PCS offerings constitute potential competition to LECs, because LEC participation in PCS would produce significant economies between wireline and PCS networks and promote rapid development of PCS services. BellSouth and Summit argue that if the Commission does impose a cable television eligibility ban, it should apply only to the dominant cable company in each service area.

114. Two parties oppose allowing LECs and cable operators to bid on LMDS licenses in the areas where they currently provide service.¹⁹⁶ M3ITC states that telephone companies currently provide all forms of telephony, including video teleconferencing, and that they have been granted authority to provide video programming as well. If such companies are permitted to be LMDS licensees, M3ITC argues, there is less likelihood that these services will be competitive, and development of the fiber optic telecommunications highway envisioned by the Commission may be threatened. M3ITC claims that failure to adopt an ownership restriction could result in "[a]llowing the telephone companies to own a second delivery system that might otherwise provide healthy competition to its telecommunications and video dialtone services." Further, M3ITC argues that open eligibility would harm the public interest by preventing small business entrepreneurs from participating in LMDS in a

¹⁹⁵ Ameritech Comments at 3; Bell Atlantic Comments at 6; BellSouth Comments at 10; Joint Parties Comments at 4-5; NCTA Comments at 4-6; NYNEX Comments at 2; PTWBS Comments at 2; Summit Comments at 1; TI Comments at 18.

¹⁹⁶ M3ITC Comments at 4-5; Emc³ Comments at 7-8. M3ITC also asks the Commission to consider a restriction against MMDS licensees obtaining LMDS licenses.

meaningful way.

115. Emc³ notes that residential markets are currently dominated by LECs, and asserts that because of this dominance it generally would be anticompetitive to allow these firms to hold LMDS licenses in the same service areas, and that obtaining such licenses would enable LECs to deter the introduction of competition. Instead of a complete ban on LEC participation in LMDS, Emc³ proposes that LECs should be eligible to hold a single 50 MHz license, which would allow them to supplement their existing systems with interactive capability or other features. Emc³ claims that this restriction would be consistent with past Commission decisions prohibiting cable firms from holding MMDS licenses within their franchise areas and prohibiting cellular firms from holding PCS licenses within their service areas.

116. CTA does not believe that any particular industry should be precluded from acquiring a LMDS license. CTA argues that the presence of established telecommunications companies will help lower equipment costs and raise the acceptability of LMDS in the marketplace. To guard against anticompetitive consequences, CTA recommends that LECs that win LMDS licenses "that cover any part of or any area immediately adjacent to their existing territory" be subject to more stringent build-out requirements. Specifically, CTA proposes that these incumbent service providers must make service available to 40 percent of the population within three years, and 70 percent of the population within six years. CTA argues that this proposal is consistent with the Commission's goal when developing rules for PCS auctions and service to foster entry and competition to the maximum degree possible.¹⁹⁷

117. CellularVision makes the general statement that the Commission should promote maximum competition among service providers and that it should encourage new entrants and diversity in the telephone industry.¹⁹⁸ In a letter to the Commission dated March 29, 1996, CellularVision amends its position on eligibility. It argues that the regional "Bell" operating companies (plus affiliates) and the ten largest cable systems (plus affiliates) should each be limited to acquiring a single LMDS license that is not within its current service area. Similarly, RioVision asks that the Commission weigh carefully implementation of cross-ownership restrictions for telephony providers to enable entrepreneurial LMDS licensees the maximum opportunity to furnish competition to those firms.¹⁹⁹ Titan also requests generally that the Commission adopt rules which will foster long-term competition within the multichannel television distribution markets served by LMDS operators.²⁰⁰

¹⁹⁷ CTA extends its argument to cable TV companies and MMDS licensees, as well.

¹⁹⁸ CellularVision Comments at 19.

¹⁹⁹ RioVision Comments at 3.

²⁰⁰ The general statements by CellularVision, RioVision, and Titan apparently include concern about participation by CMRS and cable TV firms as well. RioVision's and Titan's statements also apparently extend to MMDS licensees. However, no analysis of the impact of permitting these categories of firms to

118. BellSouth responds to M3ITC's argument that eligibility restrictions should encourage entry of smaller firms by noting that there are a number of technologies available besides LMDS that smaller firms could use to provide multichannel video programming, and that no bottlenecks exist preventing entry using these technologies. BellSouth also claims that a large capital investment will be required to construct an LMDS system for a BTA, which small firms might find difficult to finance. Finally, BellSouth argues that M3ITC ignores the fact that telephony will be only a secondary use of LMDS spectrum.

c. 1996 Act

119. The 1996 Act contains a number of provisions designed to facilitate the entry of LECs and cable operators into each others' markets. The cable-telephone cross-ownership ban was eliminated.²⁰¹ Local franchise authorities were prohibited from imposing a franchise requirement or otherwise prohibiting, restricting, or limiting the ability of a cable operator to provide telecommunications services.²⁰² The video dialtone regulations, which previously governed LEC provision of video programming by means of cable systems in their telephone service areas, were also eliminated, and replaced by the "open video system" regime.²⁰³ With respect to incumbent LECs, the 1996 Act creates a number of positive incentives for the rapid introduction of new, facilities-based providers of local exchange service.²⁰⁴ Finally, to ensure future competition between telephone and cable operators, these entities with certain limited exceptions were prohibited from acquiring more than a 10 percent ownership interest in each other, and from engaging in joint ventures or partnerships to provide either telephony or video distribution.²⁰⁵ The overall statutory scheme contemplates vigorous competition between LECs and cable operators, with appropriate safeguards to avoid elimination of potential sources of competition. Another important purpose of the 1996 Act is to facilitate the entry of new players in competition with both LECs and cable operators.

120. After the enactment of the Telecommunications Act a number of parties filed *ex parte* comments in which they argue that incumbent LECs and cable companies should not be eligible to bid for the single LMDS license in their service areas. MCI Telecommunications Corp. (MCI) and WebCel Communications, Inc. argue that LECs and major cable television Multiple System Operators ("MSOs") have substantial economic incentives to forestall

acquire LMDS licenses in their service areas is included in the comments and no recommendation of a cross-ownership restriction is made.

²⁰¹ Section 301(b)(1) of the 1996 Act.

²⁰² Section 303 of the Act.

²⁰³ See generally, 47 U.S.C. §§ 571 et. seq. and 47 U.S.C. 573.

²⁰⁴ See generally, Sections 302, 402(B)(2), and 706 of the Act.

²⁰⁵ See generally, Section 652(a)(b)(c).

deployment of LMDS as a direct substitute for their facilities-based, monopoly networks.²⁰⁶ Specifically, WebCel argues that the Telecommunications Act clarifies Congressional intent that monopolies should not have power to exclude competitors from access to subscribers through discriminatory interconnection (citing Section 251), or by buying facilities-based competitors to prevent competition in that manner (citing Section 652). Accordingly, WebCel proposes that LMDS regulations require:

- (a) Auction eligibility rules precluding LECs and MSOs from bidding for LMDS spectrum until there is effective, facilities-based competition for each within each of their local service areas.
- (b) License transfer and assignment prohibition for LECs and MSOs until effective, facilities-based competition exists.
- (c) Licensing regulations that limit LEC and MSO investment in designated entities or other preferred auction participants, who bid for LMDS spectrum within the same monopoly service areas.

121. WebCel goes on to argue that a number of facts make LMDS a unique and valuable resource for creating the type of telecommunications capabilities promoted by the Telecommunications Act. It states that first, LMDS is truly broadband, capable of "massive voice and data throughput; second, that because service is fixed, it is better positioned than mobile services such as PCS and cellular to offer a viable alternative to cable and fiber networks; third, LMDS is a local application for which the licensees will stand on their own without the need for roaming agreements or national standards; and fourth, LMDS is positioned to be a full-service substitute for core LEC and MSO services.

122. Finally, WebCel argues that relying on auction competition will not ensure a fair outcome if monopoly carriers are allowed to participate, because monopoly carriers will value their auction process based on the opportunity cost of lost monopoly profits and market share. It charges that the record does not contain evidence that LECs or MSOs could attain economies of scope using LMDS spectrum, and it argues that build-out requirements are insufficient to ensure that the monopoly carriers will not effectively warehouse spectrum by ensuring that it is not used for facilities-based local competition.

123. Similarly, MCI advocates a complete ban on LEC and MSO participation in auctions for LMDS spectrum or on the holding of an attributable interest, in any license area which overlaps any of their local telephone or cable franchise area.²⁰⁷ MCI also suggests that

²⁰⁶ Letter to Hon. Reed E. Hundt, filed April 16, 1996, from Glenn B. Manishin, Esquire, on behalf of WebCel, ("WebCel April 16 Letter"), at 1. Letter to Hon. Reed E. Hundt, filed May 24, 1996, from Donald F. Evans, Vice-President, Federal Regulatory Affairs, MCI Telecommunications Corporation ("MCI Letter").

²⁰⁷ MCI Letter at 1.

they be prohibited for the initial LMDS license term, or at a minimum until effective competition exists as determined by the Commission, from the post-auction acquisition of any attributable interest in an LMDS operator in an overlapping service area.²⁰⁸

124. Comments filed by the Attorneys General of Pennsylvania, Minnesota and Wisconsin discussed their efforts to enforce anti-trust provisions against the cable industry vis-a-vis DBS.²⁰⁹ They argue that this experience has made them "sensitive to situations in which incumbent monopolists have an incentive to stifle competition." The Attorneys General argue that the Telecommunications Act clearly intends to facilitate and promote local competitive entry, and that LMDS is an excellent way to promote this competition. They state that they have seen many merger and buy-out cases where a monopolist is "all too willing to pay or bid premium prices for the last remaining competitor to assure itself of future monopoly profits."²¹⁰ These comments were supported by a subsequent letter from Attorneys General of Delaware, Florida, Idaho, Iowa, Massachusetts, Missouri, Oklahoma, Virginia, and West Virginia.²¹¹

3. Discussion

125. In determining whether it would be in the public interest to restrict LEC or cable eligibility to obtain a LMDS license within their respective service areas, we consider whether LMDS will provide a unique and important new source of competition to incumbent cable and telephone companies. The record of this proceeding strongly supports the conclusion that LMDS is a potentially important source of competition to both LECs and cable operators. 28 GHz LMDS licenses will permit use of up to 1.3 GHz of spectrum by a single provider, and equipment is relatively close to marketability. While it is not possible to identify all potential uses of LMDS, licensees could use this unparalleled amount of spectrum to construct sophisticated networks that will incorporate aspects of many current telecommunications offerings. It also appears that LMDS is uniquely positioned to provide competitive telecommunications services and video program delivery because of its large potential for two-way broadband capabilities. In considering eligibility for LECs and cable operators within their geographic service areas one must weigh the potential for competition

²⁰⁸ *Id* at 2.

²⁰⁹ Letter to Hon. Reed E. Hundt, filed May 10, 1996, from Thomas W. Corbett, Jr. Attorney General of Pennsylvania, from James E. Doyle, Attorney General of Wisconsin, and from Hubert H. Humphrey, III, Attorney General of Minnesota.

²¹⁰ *Id.*

²¹¹ Letter to Hon. Reed E. Hundt, filed June 28, 1996, from M. Jane Brady, Attorney General of Delaware; Robert A. Butterworth, Attorney General of Florida; Alan G. Lance, Attorney General of Idaho; Tom Miller, Attorney General of Iowa; Scott Harshbarger, Attorney General of Massachusetts; Jeremiah W. Nixon, Attorney General of Missouri; Drew Edmondson, Attorney General of Oklahoma; James S. Gilmore, Attorney General of Virginia; and Darrell V. McGraw, Jr., Attorney General of West Virginia.

presented by open entry against the possibility that this spectrum may be used to forestall rather than promote competition. Open eligibility may delay or eliminate an opportunity to increase the number of competitors in the local exchange telephony and multichannel video programming markets. On the other hand, a bar on eligibility could prevent LECs and cable operators from using LMDS to compete against each other more effectively and rapidly or to provide new services not now offered by any firm. It also is possible that by restricting eligibility we prevent some potential providers from realizing efficiencies of scale and scope that could be realized if, for example, a LEC could use LMDS to expand the area it serves and to expand the range of services it offers. As a deregulatory principle, this Commission does not seek to interfere in or distort decisions based on sound business judgment by imposing unnecessary regulation. We seek comment on these issues.

126. We ask parties to comment with specificity on projected uses of LMDS spectrum, including the degree to which LMDS is uniquely suited to entry into the local exchange and multichannel video programming markets. Do LMDS licenses represent a unique and necessary resource for de-concentrating the market power of incumbent LECs and cable operators? If an LMDS license is such a resource, can it have a deconcentrating effect if it is held by an incumbent LEC or cable operator, given the range of services that can be provided using LMDS? For example, would a LEC's use of an LMDS license to provide video services reduce the market power of the incumbent cable operator? Are there other realistic means of entry into these markets? In addressing this point, we ask parties to discuss other realistic means of entry in terms of (1) the availability of similar spectrum-based services; (2) technological factors; (3) economic cost; and (4) timing.

127. We also ask for comment on whether there are any inherent cost advantages possessed by incumbent LECs or cable operators in holding LMDS licenses to provide service within their geographic service areas. Are there any economies of scope, or other efficiencies, such as efficiencies in billing and marketing of the services? Are any of these efficiencies unique to LMDS or could a LEC or cable operator realize them using above 40 GHz band, MMDS, OVS or other wireless or wireline facilities? Are there cost advantages in use of LMDS spectrum outside the markets served by incumbents? Can these cost advantages be quantified?

128. Are there any other advantages that incumbent LECs and cable operators have in providing LMDS service? For example, does their size, experience in that telecommunications market or financial status make incumbent LECs, or more specifically the RBOCs, uniquely positioned to be strong LMDS providers? If so, will limiting incumbent LEC and cable operators from bidding on LMDS licenses only in their current service areas discourage investment in LMDS or the development of LMDS technology? Excluding incumbent LECs and cable operators, are there a sufficient number of other providers with the necessary resources and expertise to construct and operate LMDS systems? Will incumbent eligibility restrictions have any negative effects on competition in the multichannel video programming and local exchange markets -- for example by making it more difficult for incumbent LECs to compete with cable operators for the provision of video services?

129. We also ask for comment on whether an incumbent LEC or cable operator offering LMDS services within its respective geographic service area would be likely to offer it at a higher price than new entrants. Would this depend on whether the LMDS service offered by the incumbents is substitutable for the services they currently offer? Commenters are also asked to address whether it would be more cost-effective for incumbents to acquire LMDS spectrum to supplement their own existing services rather than to face immediate competition by allowing LMDS spectrum to be acquired by a potential competitor.

130. Finally, we seek comment on how the auction process can be expected to influence the concerns prompting our consideration of incumbent eligibility. Will an auction ensure the highest and best use of the spectrum -- even if an incumbent wins the license? Or, is there an economic incentive for an incumbent to bid successfully at auction and to warehouse the spectrum? Or divert it to less competitive uses? Does this economic incentive exist when the spectrum can be used for services other than those provided by the incumbent? In any case, would payment of a winning auction bid and the cost of compliance with the build-out rules proposed in the *Second Further Notice* prove a sufficient check against such warehousing?

131. If we determine that the benefits of open entry are outweighed by our desire to encourage alternative sources of competition, should we adopt any restrictions, and if so, how should they be structured? One option is to prohibit incumbent LECs and cable companies from bidding on or acquiring licenses, each within its geographic service area. Alternatively, we could limit incumbent LECs and cable companies' use of the LMDS spectrum. For example, LEC participation in LMDS could be limited to the provision of no more than a certain percentage of non-video programming, and cable participation in LMDS could be limited to the provision of no more than a certain percentage of video services. The advantage to this approach is that it is narrower than a complete eligibility restriction, and it would allow incumbent providers to use the spectrum to provide competing services, as well as supplemental incumbent services. The disadvantage to this approach is that it may impair the deployment of LMDS as a market-driven flexible broadband service and is inconsistent with the Commission's flexible spectrum policy. We seek comment on these and any other alternatives.

132. If we were to adopt any restrictions on incumbent cable and LEC participation, we need to define "incumbent" since LATA lines and cable franchise areas are not coincident with BTA boundaries. One possibility would be to use the cellular/PCS cross-ownership rule, which implicates similar competitive concerns. Consistent with this rule, an incumbent LEC or cable operator would be considered "in-region" if 20 percent or more of the population of a BTA is within a LEC's telephone service area or a cable company's franchised service area. We ask for comment on this option and on any alternative. We also seek comment on whether the same definition should be applied to both types of incumbents.

133. We also seek comment on what should constitute an attributable interest in an incumbent LEC or cable operator. In the past, the Commission has used several different

formulations of attribution in different contexts. For these purposes, we propose to consider a 10 percent or more interest, when factored through a multiplier, to be attributable. We also propose to consider a 10 percent or more interest in an affiliate of an incumbent, when factored through a multiplier, to be considered attributable. This attribution level tracks Section 652 of the 1996 Act, 47 U.S.C. § 572, and it has the same goals as we do in this proceeding.

134. In addition, if we limit the eligibility of incumbent LECs and cable operators, we seek comment on how these restrictions should be addressed in the context of our proposal in the *Third NPRM* to allow partitioning and disaggregation. We request comment on whether competitive harm would result from a LMDS licensee disaggregating its license and assigning any excess spectrum to an incumbent LEC or cable operator within their geographic service areas. Similarly, we request comment on whether any competitive harm would result from a LMDS licensee partitioning some of its service area to an incumbent LEC or MSO within their geographic service area.

135. Finally, if we were to propose any restrictions, we believe that they should continue only until there is increased competition in the video and telephony markets. In the cable context, Section 623(l) of the Communications Act sets forth a four pronged test for determining when a cable operator faces effective competition. We seek comment on whether this effective competition test is a reliable indicator of appropriate levels of multichannel video programming competition for these purposes. We focus especially on Section 623 L(1), which can be relatively easy to satisfy in rural areas. For LECs, there is no standard test for effective competition in the local exchange market. The "Competitive Checklist," set forth in Section 271(c)(2)(B) of the 1996 Act,²¹² is one part of the mechanism used to determine when the Regional Bell Operating Companies (RBOCs) may enter the in-region long distance market. We ask for comment on whether the Competitive Checklist or all the prerequisites for BOC in-region entry serves as a reliable indicator of appropriate levels of local exchange competition for determining when LECs should be allowed to hold LMDS licenses. In addition, since the "Competitive Checklist" does not apply to LECs which are not RBOCs, we seek comment on how it could be used with other LECs. We also seek comment on alternative sunset provision. For example, we could limit eligibility for such entities to a fixed period of time (such as, 3 or 5 years) with automatic sunset and optional renewal of these restrictions. We request that commenters provide information on the following questions: what alternative criteria should we use to sunset these restrictions? Should we consider the number of facilities-based competitors? Are there local competitors throughout the service area? If we do not use the "Competitive Checklist", does it suggest factors that we should incorporate into any sunset criteria we may adopt?

136. Because we plan to begin the LMDS licensing process this year, we realize that the imposition of any eligibility restrictions now, even if they sunset at some future point,

²¹² 47 C.F.R. §271(c)(2)(B).

may effectively preclude incumbent LECs and cable operators from participation in that initial licensing process. However, incumbents could offer LMDS services at a future date by acquiring all or part of the LMDS spectrum in a BTA in a post-auction transaction, if we adopt our competitive bidding rules proposed in the *Third NPRM*. We request comment on these issues.

IV. CONCLUSION

137. We conclude that adoption of this *Report & Order* segments the 28 GHz band in a manner designed to allow all proposed services to move forward expeditiously, bringing new innovative services to consumers. Further, we conclude that our proposal to designate additional spectrum at 31 GHz for LMDS serves the public interest by ensuring the greatest technological flexibility in two-way interactive LMDS systems. Finally, we conclude that it is in the public interest to seek additional comment on whether we should adopt eligibility of use restrictions for incumbent LECs and cable operators seeking to obtain LMDS spectrum within their geographical service areas.

VI. PROCEDURAL MATTERS - Regarding *Fourth NPRM*

A. Regulatory Flexibility Act

138. With respect to the *Final Report and Order*, a Final Regulatory Flexibility Analysis is contained in Appendix C.

139. With respect to this *Fourth Notice of Proposed Rule Making*, an Initial Regulatory Flexibility Analysis (IRFA) is also contained in Appendix C. As required by Section 603 of the Regulatory Flexibility Act, the Commission has prepared an IRFA of the expected impact on small entities of the proposals suggested in this document. Written public comments are requested on the IRFA. These comments must be filed in accordance with the same filing deadlines as comments on the *Fourth Notice of Proposed Rulemaking*, but they must have a separate and distinct heading designating them as responses to the Initial Regulatory Flexibility Act Analysis. The Secretary shall send a copy of this *Fourth Notice of Proposed Rulemaking*, including the Initial Regulatory Flexibility Analysis, to the Chief Counsel for Advocacy of the Small Business Administration in accordance with paragraph 603(a) of the Regulatory Flexibility Act. Pub. L. No. 96-354, 94 Stat. 1164, 5 U.S.C. § 601 et seq. (1981).

B. Ex Parte Rules -- Non-Restricted Proceeding

140. This is a non-restricted notice and comment rulemaking proceeding. Ex parte presentations are permitted except during the Sunshine Agenda period, provided they are disclosed as provided in Commission rules. See generally 47 C.F.R. §§ 1.1201, 1.1203, and 1.1206(a).

C. Comment Dates

141. Pursuant to applicable procedures set forth in Sections 1.415 and 1.419 of the Commission's rules, 47 C.F.R. §§ 1.415 and 1.419, interested parties may file comments on or before **August 12, 1996**, and reply comments on or before **August 22, 1996**. To file formally in this proceeding, you must file an original and four copies of all comments, reply comments and supporting comments. If you want each Commissioner to receive a personal copy of your comments, you must file an original plus eight copies. You should send comments and reply comments to Office of the Secretary, Federal Communications Commission, Washington, D.C. 20554. Comments and reply comments will be available for public inspection during regular business hours in the FCC Reference Center of the Federal Communications Commission, Room 239, 1919 M Street, N.W., Washington, D.C. 20554.

E. Initial Paperwork Reduction Act of 1995 Analysis

142. This Fourth Notice of Proposed Rulemaking does not contain a proposed or modified information collection.

F. Further Information

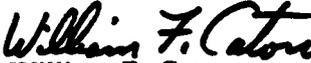
143. For further information concerning the 31 GHz proceeding, contact Bob James at (202) 418-0798 (Wireless Telecommunications Bureau). For further information concerning the eligibility issues, contact Nancy Booker or Walter D. Strack at (202) 418-1310 (Policy Division, Wireless Telecommunications Bureau).

VII. Ordering Clauses

144. Authority for issuance of this Fourth Notice of Proposed Rulemaking is contained in Sections 4(i), 303(r) and 309(j) of the Communications Act of 1934, as amended, 47 U.S.C. §§ 154(i), 303(r) and 309(j).

145. Accordingly, **IT IS ORDERED** that Part 25 and Part 101 of the Commission's rules are amended as specified in Appendix B, effective sixty (60) days after publication in the Federal Register.

FEDERAL COMMUNICATIONS COMMISSION


William F. Caton
Acting Secretary

Appendix A
List of Parties Filing Comments
CC Docket No. 92-297

Comments: (Filed September 7, 1995)

1. Airtouch Communications, Inc.
2. Alcatel Network Systems, Inc.
3. Ameritech Operating Company
4. Andrew Corporation
5. Association of America's Public Television Stations and Public Broadcasting Service
6. Bell Atlantic
7. BellSouth Corporation, BellSouth Telecommunications, Inc., BellSouth Enterprises, Inc.
8. Boeing Defense & Space Group (VP James P. Nobitt letter to Chairman Reed Hundt)
9. CellularVision
10. Comtech Associates, Inc.
11. Constellation Communications
12. Cox Enterprises Inc., Comcast Corporation, and Jones Intercable, Inc.
13. Digital Microwave Corporation
14. Duncan, Weinbert, Miller & Pembroke, P.C. (for state and local government entities)
15. Dwyre, Douglas (Globalstar)(President L/Q Partnership, L.P., letter to Chairman)
16. Endgate Corporation
17. Entertainment Made Convenient (Emc³) International, Inc.
18. GE American Communication, Inc.
19. GHz Equipment Company, Inc.
20. GTE
21. Harris Corporation-Farinon Division
22. Hewlett-Packard Company
23. Hughes Communications Galaxy
24. Lockheed Martin Corporation
25. Loral Aerospace Holdings, Inc.
26. Loral/QUALCOMM Partnership, L.P.
27. M3 Illinois Telecommunications
28. Motorola Satellite Communications, Inc. and Iridium, Inc.
29. National Aeronautics and Space Administration
30. National Cable Television Association, Inc.
31. Northern Telecom
32. NYNEX Corporation
33. Orion Network Systems, Inc.
34. Pacific Telesis Wireless Broadband Services
35. PanAmSat Corporation
36. RioVision, Incorporated
37. Satellite Industry Association
38. Telecommunications Industry Association (+corrigendum)

39. Teledesic Corporation (+correction)
40. Telephone & Data Systems, Inc.
41. Texas Instruments, Inc.
42. Titan Information Systems Corporation
43. TRW Inc.
44. Wireless Cable Association International

Reply Comments (filed October 10, 1995)

1. Bell Atlantic Corporation
2. BellSouth Corp., BellSouth Telecommunications, Inc. & BellSouth Enterprise, .
3. CellularVision
4. ComTech Associates
5. Entertainment Made Convenient (Emc3)
6. GE American Communications, Inc.
7. GHz Equipment Company, Inc.
8. Hughes Communications, Inc.
9. Loral Aerospace Holdings, Inc.
10. Loral/Qualcomm Partnership, L.P.
11. Motorola Satellite Communications, Inc. & Iridium, Inc.
12. NetSat 28 Company, Inc.
13. Nynex Corporation
14. Orion Network Systems, Inc.
15. Pacific Telesis
16. Telecommunications Industry Association
17. Teledesic Corporation
18. Texas Instruments, Inc.
19. TRW Inc.

Appendix B

Rule Amendments to 47 C.F.R. Part 25 and Part 101 of the Commission's rules

Part 25 of the Commission's Rules and Regulations (Chapter I of Title 47 of the Code of Federal Regulations) is amended as follows:

1. Section 25.203 is amended by adding paragraph (h), to read as follows:

§ 25.203

* * * * *

(h) Sites and frequencies for GSO and NGSO earth stations, operating in a frequency band where both have a co-primary allocation, shall be selected to avoid earth station antenna mainlobe-to-satellite antenna mainlobe coupling, between NGSO systems and between NGSO and GSO systems, in order to minimize the possibility of harmful interference between these services.

(1) Prior to filing an earth station application, in bands with co-primary allocations to NGSO and GSO earth stations, the applicant shall coordinate the proposed site and frequency usage with existing earth station licensees and with current earth station authorization applicants.

2. A new Section 25.250 is proposed to read as follows:

§ 25.250 Sharing between NGSO MSS Feeder links Earth Stations in the 19.3 -19.7 GHz and 29.1 - 29.5 GHz Bands

(a) NGSO MSS applicants shall be licensed to operate in the 29.1 - 29.5 GHz band for Earth-to-space transmissions and 19.3-19.7 GHz for space-to-Earth transmissions from feeder link earth station complexes. A "feeder link earth station complex" may include up to three (3) earth station groups, with each earth station group having up to four (4) antennas, located within a radius of 75 km of a given set of geographic coordinates provided by NGSO-MSS licensees or applicants.

(b) Licensees of NGSO MSS feeder link earth stations separated by 800 km or less are required to coordinate their operations, see §25.203. The results of the coordination shall be reported to the Commission.

3. A new Section 25.257 is added to read as follows:

§ 25.257 Special requirements for operations in the band 29.1 - 29.25 GHz

(a) Special requirements for operations in the band 29.1 - 29.25 GHz between NGSO MSS and LMDS:

(1) Non-geostationary mobile satellite service (NGSO MSS) operators shall be licensed to use the 29.1 - 29.25 GHz band for Earth-to-space transmissions from feeder link earth station complexes. A "feeder link earth station complex" may include up to three (3) earth station groups, with each earth station group having up to four (4) antennas, located within a radius of 75 km of a given set of geographic coordinates provided by a NGSO MSS licensee or applicants pursuant to §101.147.

(2) A maximum of seven (7) feeder link earth station complexes in the contiguous United States, Alaska and Hawaii may be placed into operation, in the largest 100 MSAs, in the band 29.1 - 29.25 GHz in accordance with §25.203 and §101.147.

(3) One of the NGSO MSS operators licensed to use the 29.1- 29.25 GHz band may specify geographic coordinates for a maximum of eight feeder link earth station complexes that transmit in the 29.1 - 29.25 GHz band. The other NGSO MSS operator licensed to use the 29.1 - 29.25 GHz band may specify geographic coordinates for a maximum of two feeder link earth station complexes that transmit in the 29.1 - 29.25 GHz band.

(4) Additional NGSO MSS operators may be licensed in this band if the additional NGSO MSS operator shows that its system can share with the existing NGSO MSS systems.

(5) All NGSO MSS operators shall cooperate fully and make reasonable efforts to identify mutually acceptable locations for feeder link earth station complexes. In this connection, any single NGSO MSS operator shall only identify one feeder link earth station complex protection zone in each category identified in §101.147(c)(2) until the other NGSO MSS operator has been given an opportunity to select a location from the same category.

4. A new Section 25.258 is added to read as follows:

§ 25.258 Sharing between NGSO MSS Feeder links Stations and GSO FSS services in the 29.25- 29.5 GHz Bands

(a) Operators of NGSO MSS feeder link earth stations and GSO FSS earth stations in the band 29.25 to 29.5 GHz where both services have a co-primary allocation shall cooperate fully in order to coordinate their systems. During the coordination process both service operators shall exchange the necessary technical parameters required for coordination.

(b) Licensed GSO FSS systems shall, to the maximum extent possible, operate with frequency/polarization selections, in the vicinity of operational or planned NGSO MSS feeder link earth station complexes, that will minimize instances of unacceptable interference to the

GSO FSS space stations.

(c) NGSO MSS satellites operating in this frequency band shall compensate for nodal regression due to the oblate shape of the Earth, and thus maintain constant successive sub-satellite ground tracks on the surface of the Earth.

(d) NGSO MSS systems applying to use the 29.25 - 29.5 GHz band, for feeder link earth station uplink, will have to demonstrate that their system can share with the authorized U.S. GSO/FSS systems operating in this band.

Part 101 of the Commission's Rules and Regulations (Chapter I of Title 47 of the Code of Federal Regulations) is amended as follows:

5. Amend rule section 101.3 by adding new paragraphs, in alphabetical order, to read as follows:

Local Multipoint Distribution Service Hub Station. A fixed point-to-multipoint radio station in a Local Multipoint Service System that provides one-way or two-way communication with Local Multipoint Distribution Service Subscriber Stations.

Local Multipoint Distribution Service System. A fixed point to-multipoint radio system consisting of Local Multipoint Distribution Service Hub Stations and their associated Local Multipoint Distribution Service Subscriber Stations.

Local Multipoint Distribution Service Subscriber Station. Any one of the fixed microwave radio stations located at users' premises, lying within the coverage area of a Local Multipoint Distribution Service Hub Station, capable of receiving one-way communications from or providing two-way communications with the Local Multipoint Distribution Service Hub Station.

Local Multipoint Distribution Service Backbone Link. A point-to-point radio service link in a Local Multipoint Distribution Service System that is used to interconnect Local Multipoint Distribution Service Hub Stations with each other or with the public switched telephone

network.

6. Section 101.109 is amended by revising the Table entry for the band 27,500 MHz to 29,500 MHz line to reads as follows:

§ 101.109 Bandwidth.

* * * * *

Frequency Band Maximum (MHz) Authorized Bandwidth

27,500 to 28,350 MHz	850 MHz
29,100 to 29,250 MHz	150 MHz

7. Amend rule Section 101.113 by adding new subsection (c) as follows:

§ 101.113 LMDS Single Station EIRP Limit: (c)(1) Transmitter power limitations: Point-to-point stations in the 29.1-29.25 GHz band for the LMDS backbone between LMDS hubs shall be limited to a maximum allowable e.i.r.p. density per carrier of 23 dBW/MHz in any one megahertz in clear air, and may exceed this limit by employment of adaptive power control in cases where link propagation attenuation exceeds the clear air value due to precipitation and only to the extent that the link is impaired.

(c)(2) Hub Transmitter EIRP Spectral Area, Density Limit: LMDS applicants shall demonstrate that, under clear air operating conditions, the maximum aggregate of LMDS transmitting hub stations in a Basic Trading Area in the 29.1-29.25 GHz band will not transmit a co-frequency hub-to-subscriber e.i.r.p. spectral area density in any azimuthal direction in excess of X dBW/(MHz-km²) when averaged over any 4.375 MHz band, where X is defined in Table 1. Individual hub stations may exceed their clear air e.i.r.p.s by employment of adaptive power control in cases where link propagation attenuation exceeds the clear air value and only to the extent that the link is impaired.

(i) The e.i.r.p. aggregate spectral area density is calculated as follows:

$$10 \log_{10} \frac{1}{A} \sum_{i=1}^N p_i \text{ dBW/MHz-km}^2$$

where:

N = number of co-frequency hubs in BTA

A = Area of BTA in km²

p_i = spectral power density into antenna of i-th hub (in W/MHz)

g_i = gain of i-th hub antenna at zero degree elevation angle

Each p_i and g_i are in the same 1 MHz within the designated frequency band.

(ii) The climate zones in Table 1 are defined for different geographic locations within the US as shown in Appendix 28 of the ITU Radio Regulations.

Table 1*

Climate Zone	e.i.r.p. Spectral Density (Clear Air) (dBW/MHz-km ²)**
1	-23
2	-25
3,4,5	-26

* LMDS system licensees in two or more BTAs may individually or collectively deviate from the spectral area density computed above by averaging the power over any 200 km by 400 km area, provided that the aggregate interference to the satellite receiver is no greater than if the spectral area density were as specified in Table 1. A showing to the Commission comparing both methods of computation is required and copies shall be served on any affected non-GSO 20/30 GHz MSS providers.

** See Section 21.1007(c)(i) for the population density of the BTA

(c)(3) Hub Transmitter e.i.r.p. Spectral Area Density Limit at Elevation Angles Above the Horizon:

LMDS applicants shall demonstrate that, under clear air operating conditions, the maximum aggregate of LMDS transmitting hub stations in a Basic Trading Area in the 29.1-29.25 GHz band will not transmit a co-frequency hub-to-subscriber e.i.r.p. spectral area density in any azimuthal direction in excess of X dBW/(MHz-km²) when averaged over any 4.375 MHz band where X is defined in Table 2. Individual hub stations may exceed their clear air e.i.r.p.s by employment of adaptive power control in cases where link propagation attenuation exceeds the clear air value and only to the extent that the link is impaired.

(i) The e.i.r.p. aggregate spectral area density is calculated as follows:

$$10 \log_{10} \frac{1}{A} \sum_{i=1}^N \text{e.i.r.p.}(a_i) \text{ dBW/MHz-km}^2$$

where:

N = number of co-frequency hubs in BTA
 A= Area of BTA in km²
 e.i.r.p. (ai) = equivalent isotropic radiated spectral power density of the i-th hub (in W/MHz)
 at elevation angle a

Table 2

Elevation Angle (a)	Relative e.i.r.p. Density (dBW/MHz-km ²)
0° ≤ a ≤ 4.0°	e.i.r.p.(a) = e.i.r.p.(0°) + 20 log (sin ^{1/2} x)(1/√x) where x = (a + 1)/7.5°
4.0° < a ≤ 7.7°	e.i.r.p.(a) = e.i.r.p.(0°) - 3.85a + 7.7
a > 7.7°	e.i.r.p.(a) = e.i.r.p.(0°) - 22

where a is the angle in degrees of elevation above horizon. e.i.r.p.(0°) is the hub e.i.r.p. area density at the horizon used in Section 101.113c(2). The nominal antenna pattern will be used for elevation angles between 0° and 8°, and average levels will be used for angles beyond 8°, where average levels will be calculated by sampling the antenna patterns in each 1° interval between 8° and 90°, dividing by 83.

(ii) LMDS system licensees in two or more BTAs may individually or collectively deviate from the spectral area density computed above by averaging the power over any 200 km by 400 km area, provided that the aggregate interference to the satellite receiver is no greater than if the spectral area density were as specified in Table 1. A showing to the Commission comparing both methods of computation is required and copies shall be served on any affected non-GSO MSS providers.

(c)(4) Power Reduction Techniques: LMDS hub transmitters shall employ methods to reduce average power levels received by non-geostationary mobile satellite receivers, to the extent necessary to comply with SubSections (c)(1) and (c)(2), by employing the methods set forth below:

(i) Alternate Polarizations. LMDS hub transmitters in the LMDS service area may employ both vertical and horizontal linear polarizations such that 50 percent (plus or minus 10 percent) of the hub transmitters shall employ vertical polarization and 50 percent (plus or minus 10 percent) shall employ

horizontal polarization.

(ii) Frequency Interleaving. LMDS hub transmitters in the LMDS service area may employ frequency interleaving such that 50 percent (plus or minus 10 percent) of the hub transmitters shall employ channel center frequencies which are different by one-half the channel bandwidth of the other 50 percent (plus or minus 10 percent) of the hub transmitters.

(iii) Alternative Methods. As alternatives to (i) and (ii) above, LMDS operators may employ such other methods as may be shown to achieve equivalent reductions in average power density received by non-GSO MSS satellite receivers.

8. Rule Section 101.133 is amended by adding subsection (d) to read as follows:

§ 101.133(d)

LMDS Subscriber Transmissions: LMDS licensees shall not operate transmitters from subscriber locations in the 29.1-29.25 GHz band.

9. Amend rule section 101.147 by adding new subsection (x) as follows:

§ 101.147 Frequency Assignments

* * * * *

(x) Special requirements for operations in the band 29.1-29.25 GHz:

(1)(i) LMDS receive stations operating on frequencies in the 29.1- 29.25 GHz band within a radius of 75 nautical miles of the geographic coordinates provided by a non-GSO MSS licensee pursuant to subsections (c)(2) or (c)(3)(i) (the "feeder link earth station complex protection zone") shall accept any interference caused to them by such earth station complexes and shall not claim protection from such earth station complexes.

(ii) LMDS licensees operating on frequencies in the 29.1-29.25 GHz band outside a feeder link earth station complex protection zone shall cooperate fully and make reasonable efforts to resolve technical problems with the non-GSO MSS licensee to the extent that transmissions from the non-GSO MSS operator's feeder link earth station complex interfere with an LMDS receive station.

(2) No more than 15 days after the release of a public notice announcing the commencement

of LMDS auctions, feeder link earth station complexes to be licensed pursuant to Section 25.257 shall be specified by a set of geographic coordinates in accordance with the following requirements: no feeder link earth station complex may be located in the top eight (8) metropolitan statistical areas ("MSAs"), ranked by population, as defined by the Office of Management and Budget as of June 1993, using estimated populations as of December 1992; two (2) complexes may be located in MSAs 9 through 25, one of which must be Phoenix, AZ (for a complex at Chandler, AZ); two (2) complexes may be located in MSAs 26 to 50; three (3) complexes may be located in MSAs 51 to 100, one of which must be Honolulu, Hawaii (for a complex at Waimea); and the three (3) remaining complexes must be located at least 75 nautical miles from the borders of the 100 largest MSAs or in any MSA not included in the 100 largest MSAs. Any location allotted for one range of MSAs may be taken from an MSA below that range.

(3)(i) Any non-GSO MSS licensee may at any time specify sets of geographic coordinates for feeder link earth station complexes with each earth station contained therein to be located at least 75 nautical miles from the borders of the 100 largest MSAs.

(ii) For purposes of subsection (c)(3)(i), non-GSO MSS feeder link earth station complexes shall be entitled to accommodation only if the affected non-GSO MSS licensee preapplies to the Commission for a feeder link earth station complex or certifies to the Commission within sixty days of receiving a copy of an LMDS application that it intends to file an application for a feeder link earth station complex within six months of the date of receipt of the LMDS application.

(iii) If said non-GSO MSS licensee application is filed later than six months after certification to the Commission, the LMDS and non-GSO MSS entities shall still cooperate fully and make reasonable efforts to resolve technical problems, but the LMDS licensee shall not be obligated to re-engineer its proposal or make changes to its system.

(4) LMDS licensees or applicants proposing to operate hub stations on frequencies in the 29.1-29.25 GHz band at locations outside of the 100 largest MSAs or within a distance of 150 nautical miles from a set of geographic coordinates specified under subsection (c)(2) or (c)(3)(i) shall serve copies of their applications on all non-GSO MSS applicants, permittees or licensees meeting the criteria specified in § 25.257(a). Non-GSO MSS licensees or applicants shall serve copies of their feeder link earth station applications, after the LMDS auction, on any LMDS applicant or licensee within a distance of 150 nautical miles from the geographic coordinates that it specified under subsection (c)(2) or (c)(3)(i). Any necessary coordination shall commence upon notification by the party receiving an application to the party who filed the application. The results of any such coordination shall be reported to the Commission within sixty days. The non-GSO MSS earth station licensee shall also provide all such LMDS licensees with a copy of its channel plan.

10. Section 101.113 is amended by revising paragraph (a) by deleting the Table entry for the 27.500 to 29.500 MHz frequency band and adding new lines to the Table to read as follows:

§ 101.113 Transmitter power limitations.

(a) * * *

Frequency Band (MHz)	Maximum allowable EIRP (1)*	
	Fixed (dBW)	Mobile (dBW)
27.500 to 28.350	55	
29.100 to 29,250	(7)	

* * *

(7) See §§ 101.113(c)

* * * * *

APPENDIX C

A. Final Regulatory Flexibility Analysis of *First Report and Order*

As required by Section 603 of the Regulatory Flexibility Act, 5 U.S.C. § 603 (RFA), an Initial Regulatory Flexibility Analysis (IRFA) was incorporated in the Third Notice of Proposed Rulemaking in this proceeding (*Third NPRM*). The Commission sought written public comments on the proposals in the *Third NPRM*, including on the IRFA. The Commission's Final Regulatory Flexibility Analysis (FRFA) in this *First Report and Order* conforms to the RFA, as amended by the Contract With America Advancement Act of 1996, (CWAAA), Pub. L. No. 104-121, 110 Stat. 847 (1996).²¹³

I. Need for and Purpose of this Action:

In this decision, the Commission adopts a band plan designating discrete spectrum segments for the Local Multipoint Distribution Systems ("LMDS"), Fixed Satellite Service (FSS) systems, and feeder links for certain Mobile Satellite Service ("MSS") systems in the 27.5-30.0 GHz band ("28 GHz band"). The Commission also adopts rules and procedures intended to facilitate the efficient use of this large spectrum segment among these three different types of services. The purposes of this action are to help launch two new broadband industries well-suited to compete in the domestic and global marketplace.

II. Summary of Issues Raised by the Public Comments in Response to the Initial Regulatory Flexibility Analysis:

No comments were filed in direct response to the IRFA. In general comments on the *Third NPRM*, however, the only licensee in the band, CellularVision, an LMDS small entity, *see infra*, believed that the plan proposed in the *Third NPRM* accommodated all competing interests for spectrum in the band. Furthermore, our proposal to grandfather CellularVision's existing system in the New York Primary Metropolitan Statistical Area, *see attached Report and Order* at ¶¶ 51-56, was supported by CellularVision as a reasonable plan to facilitate its existing operations as it phases into licensing under the new band segmentation scheme.

III. Description and Estimate of the Small Entities Subject to the Rules:

The Commission has not developed a definition of small entities applicable to GSO/FSS licensees. Therefore, the applicable definition of small entity is the definition under the Small Business Administration (SBA) rules applicable to Communications Services, Not Elsewhere Classified. This definition provides that a small entity is expressed as one with

²¹³ Subtitle II of the CWAAA is "The Small Business Regulatory Enforcement Fairness Act of 1996" (SBREFA), codified at 5 U.S.C. § 601 *et seq.*

\$11.0 million in annual receipts.²¹⁴

Estimates for GSO/FSS Satellite System Applicants for the 28 GHz Band

At present there are no GSO/FSS satellite licensees in the band and the Commission has not adopted any final service rules for satellite systems proposing to operate in the 28 GHz band. Therefore, there are no small businesses currently providing these types of broadband interactive services in the band. However, we have had a cut-off date for applications to be considered in the first GSO/FSS processing round.²¹⁵ There are a total of thirteen applications currently on file proposing to provide GSO/FSS services in the band. Eight of these systems propose global systems. Five systems propose regional coverage. We acknowledge that couple of these applications are start-up companies and we assume, that there may be the development of new satellite systems in this frequency band that may qualify as small entities pursuant to the SBA's definition.

Estimates for NGSO/FSS System Applicant in the Band

At present there are no NGSO/FSS satellite licensees in the 28 GHz band and we have not adopted any final service rules for such satellite systems proposing to operate in the band. Therefore, there are no small businesses currently providing these services in the band. However, we have had a cut-off date for applications to be considered in the first GSO/FSS processing round. Currently there is only one NGSO/FSS application on file. We assume, that there may be the development of new satellite systems in this frequency band that may qualify as small entities pursuant to the SBA's definition.

Estimates for NGSO/MSS Systems with feeder links in the 28 GHz Band

At present there are two licensed NGSO/MSS systems proposing feeder links for their systems, *see infra Report and Order* ¶ 21, in the 28 GHz band. We assume, that there may be the development of new satellite systems in this frequency band that may qualify as small entities pursuant to the SBA's definition.

Estimates for LMDS

The rules adopted in this *Report and Order* will apply to any company which chooses to apply for a license in the new services. In addition, the new rules impact fixed microwave licensees, some of whom requested that the Commission institute a channeling plan in the 28

²¹⁴ 13 C.F.R. § 121.201. Standard Industrial Classification (SIC) Code 4899.

²¹⁵ *See Ka-Band Satellite Applications Accepted For Filing: Cut-Off Established for Additional Applications.* Public Notice. Report No. SPB-20. Release No. DA 95-1689. July 28, 1995.

GHz band to set standards for point-to-point microwave equipment manufacturers. With regard to both the traditional point-to-point entities and the Local Multipoint Distribution Service (LMDS), the Commission has not developed a definition of small entities applicable to such licensees. The SBA definitions of small entity for LMDS are the definitions applicable to radiotelephone companies and to pay television services. The definition of radiotelephone companies provides that a small entity is a radiotelephone company employing fewer than 1,500 persons.²¹⁶ The definition of a pay television service is one which has annual receipts of less than \$11 million.²¹⁷ Since the Regulatory Flexibility Act amendments were not in effect until the record in this proceeding was closed, the Commission was unable to request information regarding the potential number of small businesses interested in LMDS and is unable at this time to determine the precise number of potential applicants which are small businesses.

The size data provided by the SBA does not enable us to make a meaningful estimate of the number of telecommunications providers which are small entities because it combines all radiotelephone companies with 500 or more employees.²¹⁸ We therefore used the 1992 Census of Transportation, Communications, and Utilities, conducted by the Bureau of the Census, which is the most recent information available. This document shows that only 12 radiotelephone firms out of a total of 1,178 such firms which operated during 1992 had 1,000 or more employees.²¹⁹ Therefore, a majority of LMDS entities providing radiotelephone services could be small businesses under the SBA's definition. Likewise, the size data provided by the SBA does not enable us to make a meaningful estimate of the number of cable and pay television providers which are small entities because it combines all such providers with revenues of less than \$11 million.²²⁰ We therefore used the 1992 Census of Transportation, Communications, and Utilities, (Table 2D), conducted by the Bureau of the Census, which is the most recent information available. This document shows that only 36 of 1,788 firms providing cable and pay television service have a revenue of greater than \$10 million. Therefore, the vast majority of LMDS entities providing video distribution could be small businesses under the SBA's definition.

²¹⁶ 13 C.F.R. § 121.201, Standard Industrial Classification (SIC) Code 4812.

²¹⁷ *Id.*, SIC Code 4841.

²¹⁸ U.S. Small Business Administration 1992 Economic Census Employment Report, Bureau of the Census, U.S. Department of Commerce, SIC Code 4812 (radiotelephone communications industry data adopted by the SBA Office of Advocacy).

²¹⁹ U.S. Bureau of the Census, U.S. Department of Commerce, 1992 Census of Transportation, Communications, and Utilities, UC92-S-1, Subject Series, Establishment and Firm Size, Table 5, Employment Size of Firms: 1992, SIC Code 4812 (issued May 1995).

²²⁰ *Id.*, SIC 4841.

However, in the *Third NPRM*,²²¹ we proposed to define a small business as an entity that, together with affiliates and attributable investors, has average gross revenues for the three preceding years of less than \$40 million. We have not yet received approval by the SBA for this definition because the service rules for LMDS have not been finalized. A definition of small point-to-point entities have not yet received approval by the SBA because such entities have not as yet been subject to competitive bidding procedures.

We assume, for purposes of our evaluations and conclusions in this FRFA, that nearly all of the LMDS licensees will be small entities, as that term is defined by the SBA. We note that in the accompanying Fourth Notice of Proposed Rulemaking, we ask whether eligibility of LECs and cable companies, who enjoy a monopoly or near-monopoly in their service areas, be restricted with regard to the LMDS license in their area, in order to encourage competition. Many of the competitors using LMDS to compete with LECs or cable companies could be small businesses.

With regard to traditional point-to-point microwave entities, the same analysis for small radiotelephone entities as made above applies to these entities. In the *Report and Order*, the Commission declines to specify a channeling plan for point-to-point entities.²²² It is the Commission's opinion that retaining maximum system design flexibility for LMDS licensees within their service areas precludes our specifying a point-to-point channeling plan. Entities interested in providing point-to-point service may seek other spectrum or may become LMDS licensees and configure their systems as they choose. In addition, such entities may lease spectrum, or seek partitioning or disaggregation opportunities from LMDS licensees. Moreover, the traditional point-to-point microwave equipment manufacturing industry could seek to establish standards for its members to use in the 28 GHz band. Accordingly, this Report and Order does not provide direct relief requested by, e.g., the Telecommunications Industry Association, which represents fixed microwave entities, the majority of whom may be small businesses.

Another category of small entities affected by this Report and Order are those operating in the 17.5-19.5 GHz frequency band. These entities are fixed point-to-point microwave entities of many subcategories. The same analysis for these entities as made for traditional fixed microwave entities made above applies to these entities (a definition of small point-to-point entities has not been submitted for approval by the SBA because such entities

²²¹ *In the Matter of Rulemaking to Amend Parts 1, 2, 21, and 25 of the Commission's Rules to Redesignate the 27.5-29.5 GHz Frequency Band, to Reallocate the 29.5-30.0 GHz Frequency Band, to Establish Rules and Policies for Local Multipoint Distribution Service and for Fixed Satellite Services and Suite 12 Group Petition for Pioneer's Preference*, CC Docket No. 92-297, 11 F.C.C. Rcd. 53 (1995) ("*Third NPRM*"). para. 188.

²²² Section III(H), *supra*.

have not as yet been subject to competitive bidding procedures). The Report and Order does not change the Commission's treatment of these entities, but it adds potential additional satellite operators in the band with which the entities will have to coordinate in the future. The Commission has coordination procedures in effect; should they prove inadequate in the future, we will reconsider the issue at that time.

IV. Summary of Projected Reporting, Recordkeeping and Other Compliance Requirements:

There are some reporting requirements imposed by the *Report and Order*. In some instances, it is likely that the entities filing the reports will require no professional skills for the preparation of such requests. In other cases, the services of persons with technical or engineering expertise may be required to prepare the reports. First, in one band segment, a satellite licensee is required to notify the one existing licensed LMDS operator, CellularVision, of its launch date six months prior to the satellite's launch date.²²³ It is also required to provide, upon CellularVision's request, updates on the satellite's status.²²⁴ Such a request is reasonable of CellularVision. At this time, it is not clear how many potential GSO/FSS licensees this will effect. Second, in another shared band segment, we require LMDS licensees to serve copies of their application on all NGSO/MSS applicants. At this time, it is not clear how many LMDS entities will be participating. Currently there are only two NGSO/MSS licensees who will be using this band for feeder links. Feeder links for a third NGSO/MSS system could possibly also be accommodated in this band. Fourth, we require NGSO/MSS feeder link earth stations to specify a set of geographic coordinates for the location of these earth stations, 15 days after the release of a public notice announcing the commencement of LMDS auctions. Finally, we require one NGSO/MSS licensee to provide their feeder link earth station locations to the GSO/FSS licensees. At this time, it is not clear how many potential GSO/FSS licensees this will effect.

V. Steps Taken to Minimize the Economic Impact on Small Entities:

The Commission adopts a band plan that facilitates the accommodation of all proposed systems in the 28 GHz band. We believe this plan is a reasonable accommodation of all competing interests in this new band segment, including small entities. The band plan along with the Fourth Notice of Proposed Rulemaking for the 31 GHz band, *infra* IRFA, provides both small entities and larger businesses the same opportunity to develop and operate viable systems within the band, and initiate competitive services. Our band plan also accords CellularVision, the only licensee in the band, flexibility during the implementation phase of

²²³ *Supra* ¶ 54.

²²⁴ *Id.*

the band plan.

VI. Significant Alternatives Considered and Rejected:

The Commission considered and rejected several alternatives to the band plan we adopted.²²⁵ The Commission considered various band segmentation plans over the last several months with the goal of accommodating the various divergent proposals made in response to the band plan proposed in the *Third NPRM*.²²⁶ For example, we considered plans which ultimately proved to require difficult inter-service sharing rules and to not completely support interactivity of LMDS systems.²²⁷ We also considered a band plan that designated 1000 MHz each for GSO/FSS and LMDS service. That plan, however, would have divided LMDS among three non-contiguous spectrum segments.²²⁸ This option was not acceptable to the potential LMDS service providers, including small providers, because, they argued, it would have significantly decreased spectrum efficiency for LMDS, resulting in increased cost and delay in offering both subscriber and hub equipment.²²⁹ We also considered two band plans that designated GSO/FSS systems with less than 1000 MHz.²³⁰ These options were unacceptable to the GSO/FSS applicants because, they argued, any of these plans would result in a significant loss of system capacity and revenue.²³¹ Such loss and capacity could affect potential small entities. Another plan, resulting from a GSO/FSS applicant's proposal, was also considered. It would have designated a total of 1010 MHz to GSO/FSS applicants and 985 MHz to LMDS, but required sharing of 135 MHz between GSO/FSS and LMDS.²³² However, the mutually acceptable sharing principles required to implement this plan were not developed by the LMDS and GSO/FSS parties.²³³ We were also unable to successfully propose sharing criteria.

²²⁵ See *supra* ¶¶ 38-40.

²²⁶ See *ex parte* submission filed by the International Bureau to William F. Caton, Acting Secretary. (Feb. 6, 1996) for diagrams of Commission Band Plan Options 1, 2, 2A, 2B, 3(a), 4 and 5.

²²⁷ *Supra* note 76.

²²⁸ *Supra* note 77.

²²⁹ *Supra* note 78.

²³⁰ *Supra* note 79.

²³¹ *Supra* note 80.

²³² *Supra* note 81.

²³³ *Supra* note 82.

In March 1996, NASA was also asked to undertake an immediate study to assess whether its space services and LMDS could share spectrum below 27.5 GHz.²³⁴ NASA concluded three weeks later that no rules acceptable to all parties could be drafted which would guarantee protection of NASA space services from harmful interference.²³⁵ NASA also concluded that coordination with other space service systems in the band from other administrations would make this a difficult option to implement effectively.

One alternative of not adopting a band segmentation plan for this spectrum is the preclusion of LMDS service or satellite service in the 28 GHz band. In the *Third NPRM* we tentatively concluded that denying one or the other of the proposed services for the band was not in the public interest and that both proposed services bring the promise of competition and innovative services to the nation's infrastructure. Moreover, preclusion of either service potentially affects small businesses on both the satellite side and the LMDS side.

VIII. Report to Congress

The Commission shall send a copy of this Final Regulatory Flexibility Analysis, along with this *Report and Order*, in a report to Congress pursuant to the Small Business Regulatory Enforcement Fairness Act of 1996, 5 U.S.C. § 801(a)(1)(A). A copy of this FRFA will also be published in the Federal Register.

B. Initial Regulatory Flexibility Analysis

As required by Section 603 of the Regulatory Flexibility Act,²³⁶ the Commission has prepared an Initial Flexibility Analysis (IRFA) of the expected significant economic impact on small entities by the policies and rules proposed in this Fourth Notice of Proposed Rulemaking. Written public comments are requested on the IRFA. Comments must be identified as responses to the IRFA and must be filed by the deadlines for comments on the Fourth NPRM provided in section (VI)(C).

I. Reason for Action

This Fourth Notice of Proposed Rulemaking (4th NPRM) requests comment on two issues: (1) whether the Commission should designate, on a primary protected basis, the 31.0-

²³⁴ *Supra* note 83.

²³⁵ *Supra* note 84.

²³⁶ 5 U.S.C. § 603.

31.3 GHz (31 GHz) band to Local Multipoint Distribution Service (LMDS); and (2) whether the Commission should restrict eligibility of local exchange carriers (LEC) and cable operators to hold LMDS licenses in the geographic areas they serve.

With regard to the first issue, the Commission determines that a further NPRM is necessary to accommodate a variety of LMDS system designs, services, and transmission media in the adjacent 28 GHz band. The additional spectrum would facilitate interactive systems, thus providing new and innovative communications services for residential and business users, including small businesses. Moreover, the additional spectrum potentially could benefit small businesses unable to participate in competitive bidding for licenses because additional spectrum not needed by a LMDS licensee could potentially be leased to smaller businesses. The 31 GHz band currently is licensed only on a secondary basis, and has few incumbents. Nevertheless, the Commission requests comment on whether there are any methods of accommodating these services.

With regard to the second issue, the current record of this proceeding was developed prior to the enactment of the Telecommunications Act of 1996. One of the key objectives of the Act is to expedite the introduction of competition to incumbent LECs and cable companies. In carrying out this mandate, the Commission believes it important to obtain specific comment on how its policies towards LMDS eligibility would best promote the competitive objectives of the Act. In addition, the comments received after the close of the record in this proceeding, including comments from small entities such as WebCel, convince us that further comment is warranted.

II. Objectives

The objective of this Notice is to request public comment on the proposals made herein for the efficient licensing of LMDS services, for the development and implementation of a new technology to provide innovative telecommunications services to the public.

III. Legal Basis for Proposed Rules

The authority for this action is the Administrative Procedure Act, 5 U.S.C. § 553; and sections 4(i), 4(j), 301, 303(r) of the Communications Act of 1934 as amended, 47 U.S.C. §§ 145, 301, and 303(r).

IV. Description and Estimate of Small Entities Subject to the Rules

The regulations on which the Commission seeks comment, if adopted, would apply to any small entity seeking a LMDS license. In addition, the regulations would impact small entities who are incumbent licensees in the 31.0-31.3 GHz frequency band.

The SBA definitions of small entity for LMDS are the definitions applicable to radiotelephone companies and to pay television services. The definition of radiotelephone companies provides that a small entity is a radiotelephone company employing fewer than 1,500 persons.²³⁷ The definition of a small pay television service is one which has annual receipts of less than \$11 million.²³⁸ In the Final Regulatory Flexibility Analysis for the *Report and Order*, *supra*, we were unable to make a meaningful estimate based on the 1992 Census Bureau data.

Likewise, we believe that the entities who are incumbent licensees in the 31.0-31.3 GHz frequency band may also be comprised of a majority of small entities. Such licensees are public safety entities, the majority of whom are municipalities or other local governmental entities. The SBA data base does not include governmental entities. We are required to estimate the number of such entities with populations of less than 50,000 that would be affected by our new rules.²³⁹ There are 85,006 governmental entities in the nation.²⁴⁰ This number includes such entities as states, counties, cities, utility districts and school districts. There are no figures available on what portion of this number has populations of fewer than 50,000. However, this number includes 38,978 counties, cities and towns, and of those, 37,566, or 96 percent, have populations of fewer than 50,000.²⁴¹ The Census Bureau estimates that this ratio is approximately accurate for all governmental entities. There are twenty-seven (27) incumbent licensees in the 31.0-31.3 GHz band. Accordingly, we estimate that 96 percent, or 25 to 26 of these licensees, are small entities.

We request comment on the description and the number of small entities that are significantly impacted by this proposed rule.

V. Reporting, Recordkeeping, and Other Compliance Requirements

The proposals under consideration in this NPRM would not involve any reporting or recordkeeping requirements.

Incumbent licensees in the 31.0-31.3 GHz band would have new compliance requirements vis-a-vis LMDS licensees. Our rules provide that licensees therein operate on a

²³⁷ 13 C.F.R. § 121.201, Standard Industrial Classification (SIC) Code 4812.

²³⁸ 13 C.F.R. § 121.201, Standard Industrial Classification (SIC) Code 4841.

²³⁹ RFA at Section 601(5).

²⁴⁰ 1992 Census of Governments, Bureau of the Census, U.S. Department of Commerce.

²⁴¹ *Id.*

non-interference basis, meaning that they have no rights to protection from interference, nor any obligations to not interfere with other similar incumbent operations. The Fourth NPRM proposes that LMDS be designated as a primary protected use of the band, ensuring that LMDS licensees would have interference protection from other authorized users of the band.

VI. Significant Alternatives Considered and Rejected

The Commission considered and rejected the alternative of placing all LMDS spectrum in the 28 GHz band, rather than placing a portion of the available spectrum in the 31 GHz band. The Commission concluded that LMDS requires additional spectrum to successfully deploy the variety of services proposed. It also concluded that these proposed services could be successfully implemented with non-contiguous bands of spectrum, whereas the satellite services could not. To the extent LMDS entities are small businesses, as discussed in the Final Regulatory Flexibility Analysis, *infra*, such entities are affected by this decision. However, some small entities commenting on the final band plan concurred with this approach (e.g., CellularVision, RioVision).

In addition, the Commission considered and rejected the alternative of proceeding with open eligibility in licensing, for the reasons stated herein.²⁴² This action is responsive to the many small entities commenting in this proceeding who requested that restrictions be placed upon, or considered for, local exchange carriers and major cable companies, e.g., WebCel.

VII. Federal Rules That Overlap, Duplicate, or Conflict with These Proposed Rules

None.

²⁴² See *infra*, Section IV(A).